

Traditional Ecological Knowledge of Salmon Along the Yukon River



by

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ABSTRACT

The Yukon River Drainage Fisheries Association (YRDFA) conducted a study to collect and utilize traditional ecological knowledge (TEK) held by people living in the villages along the Yukon River as an attempt to better understand changing salmon runs. The study took place during the summers of 2001 and 2002. Twenty-nine participants were interviewed in the four Yukon River villages of Alakanuk, Saint Mary's, Holy Cross and Nulato. We collected information on local observations of salmon lifecycles, abundance, environmental change and habitat.

Through this study we learned that participants are highly affected by the newly regulated subsistence schedule and that their detailed knowledge of their environment, gained through generations of local observations, assists them in understanding king salmon behavior. They attributed the changing salmon patterns, at least partly, to a natural cycle of highs and lows. Their recollection of diseased salmon was that they have only occurred recently. The size of the king salmon were reported as very similar to the past but the stocks of salmon (chums and kings) are more mixed than in the past. Different stocks of king salmon (i.e. 'white nose' and 'blue back') were described but they were not consistent for all the villages. Inter-village communication is still an important element of preparing for the arrival of the salmon but people are spending less time at fish camps. Participants described a variety of examples of TEK indicators they rely on for determining salmon arrival time, run strength and size. These TEK run projections could be compiled annually to assist managers in predicting how many salmon will return each year.

Key Wording Referencing: Yukon River, chinook salmon, king salmon, traditional ecological knowledge, subsistence

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INTRODUCTION

This report is a study of Traditional Ecological Knowledge (TEK) of king salmon (chinook) along the Yukon River. Local people expressed their concern about the changing salmon patterns and this study was developed in response to their comments. Regional Advisory Council members requested that traditional knowledge of salmon be considered in salmon fishery management during a time of declining run strength. This study was designed to collect TEK of king salmon along the Yukon River and to share this information with state and federal agencies that manage the salmon fishery. It was made possible through funding and program involvement from the U.S. Fish and Wildlife Service, Office of Subsistence Management, Fisheries Information Division cooperative agreement #701811M472 as well as funding YRDFA receives from the National Oceanic and Atmospheric Administration grant #NA06FM0316. The interviews were conducted in the four villages of Alakanuk, Saint Mary's, Holy Cross and Nulato. Knowledgeable elders and fishers were interviewed about their knowledge of king salmon during the summer of 2001 and they were revisited and reviewed our preliminary information in 2002. The following report is our results.

Geographical Description

The Yukon River is the largest river in Alaska (Figure 1). It drains approximately 35 percent of the state, and is the fifth largest drainage in North America. The Yukon River originates in British Columbia 30 miles from the Gulf of Alaska and flows over 2,300 miles to its mouth on the Bering Sea. It drains an area of about 330,000 square miles (Vania et al. 2002).

This transboundary river and associated estuarine and marine salmon environments is a complex system with high ecological variability, complicated salmon stock structures and life histories. In addition there are also sometimes conflicting political, economic, social and biological objectives among the diverse interests and agencies responsible for oversight and management. Lack of detailed knowledge causes a great deal of scientific uncertainty in salmon abundance, stock structures, migratory timing and population dynamics. Harvests and escapements of most salmon stocks in recent years are at less than desired levels and some habitat altered by human activities has a reduced ability to support salmon (Merritt 2002).

These four communities included in the study area are located along the Yukon River downstream of the confluence of the Koyukuk River (Figure 2) and are within environmentally and culturally different regions. The cultures represented include Central Yup'ik (hereafter Yupiit, the

plural of Yup'ik), Deg'Hitan Athabascan and Koyukon Athabascan (Krauss 1984). The geographical area encompasses from the mouth of the Yukon River upstream to just below the confluence with the Koyukuk River, one of the Yukon River's major tributaries. Each community falls into a different fishing district (see Appendix C). The four villages range from Alakanuk at the mouth or delta area of the Yukon River, to Saint Mary's at the first gravel beds still in the lowlands but moving upriver, to Holy Cross where hills begin and finally to Nulato, the most upriver point of this study. Nulato is located in the Nulato Hills area, with the Innoko National Wildlife Refuge or Kaiyuh Flats, as it is known locally, on the opposite side of the river.

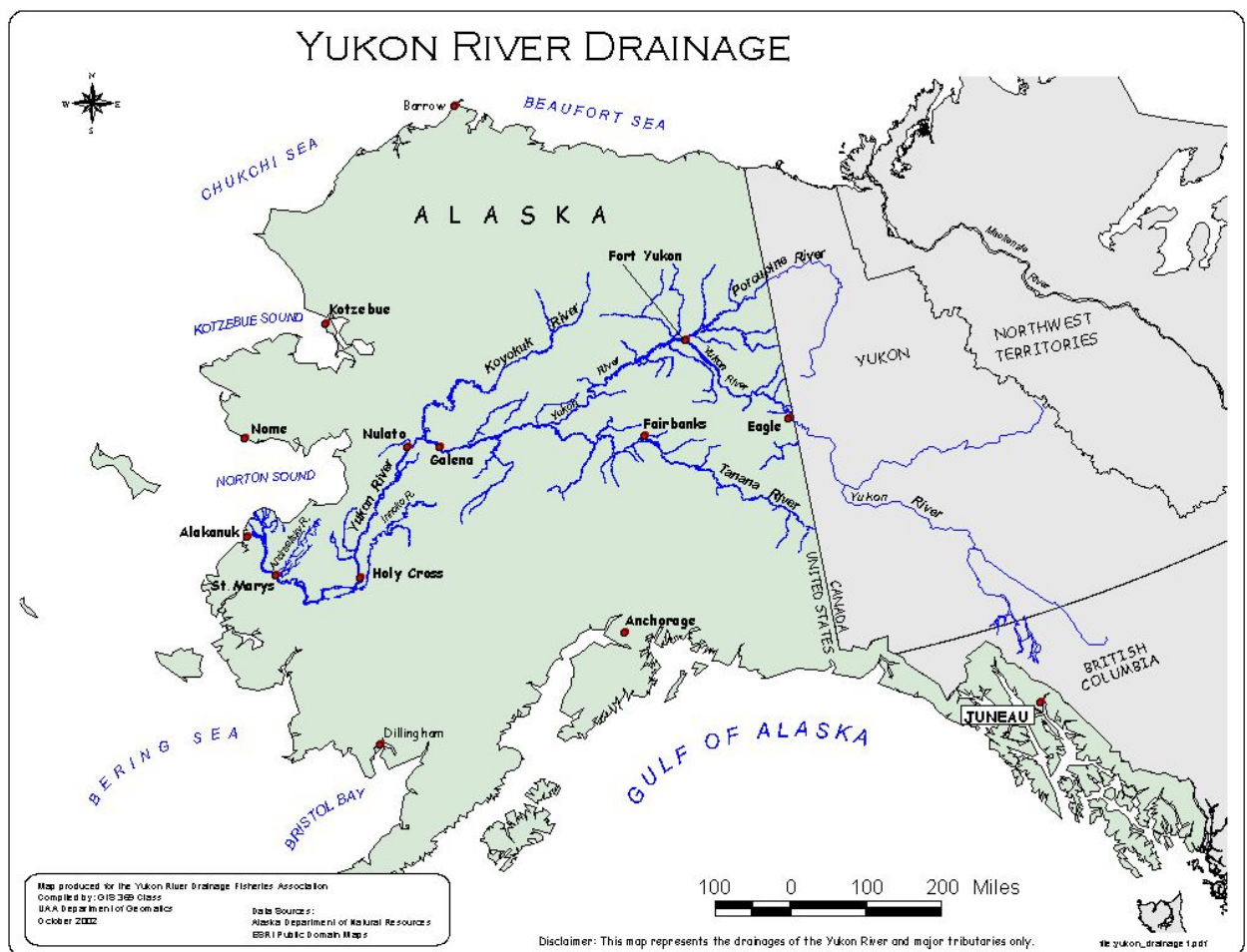


Figure 1. Yukon River Drainage

ALAKANUK -The Yukon Delta is a wide expanse of lowland coastal wetlands. When the Yukon River reaches the coast, it divides into a number of channels and empties into Norton Sound and the Bering Sea. There are three main channels or mouths: the north mouth (Apoon Pass), middle mouth (Kwipak Pass) and the south mouth (Kwikluak Pass). The movement of the *Traditional Ecological Knowledge of Salmon Along the Yukon River*

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channels shifting and depositing silt has created the vast, low, flat wetlands of the Yukon Delta. The waters offshore for 50 miles range in depth from two to three fathoms with shifting underwater channels (Fienup-Riordan 1986). The land area has a low elevation of just a few feet above sea level from the coast to Mountain Village (Fienup-Riordan 1986). Alakanuk is located at the east entrance of the major southern channel or mouth of the Yukon River. According to the Department of Community and Economic Development (DCED), Alakanuk is 15 miles from the Bering Sea, 8 miles southwest of Emmonak, and approximately 162 air miles northwest of Bethel. It is part of the Yukon Delta National Wildlife Refuge. Alakanuk is the longest village on the lower Yukon River with the development stretching over a 3-mile area along the Pass (DCED 2002). The residents of Alakanuk are primarily Yup'ik Eskimos (Krauss 1984) and rely on subsistence fishing and hunting for their livelihood (Williams 2000).

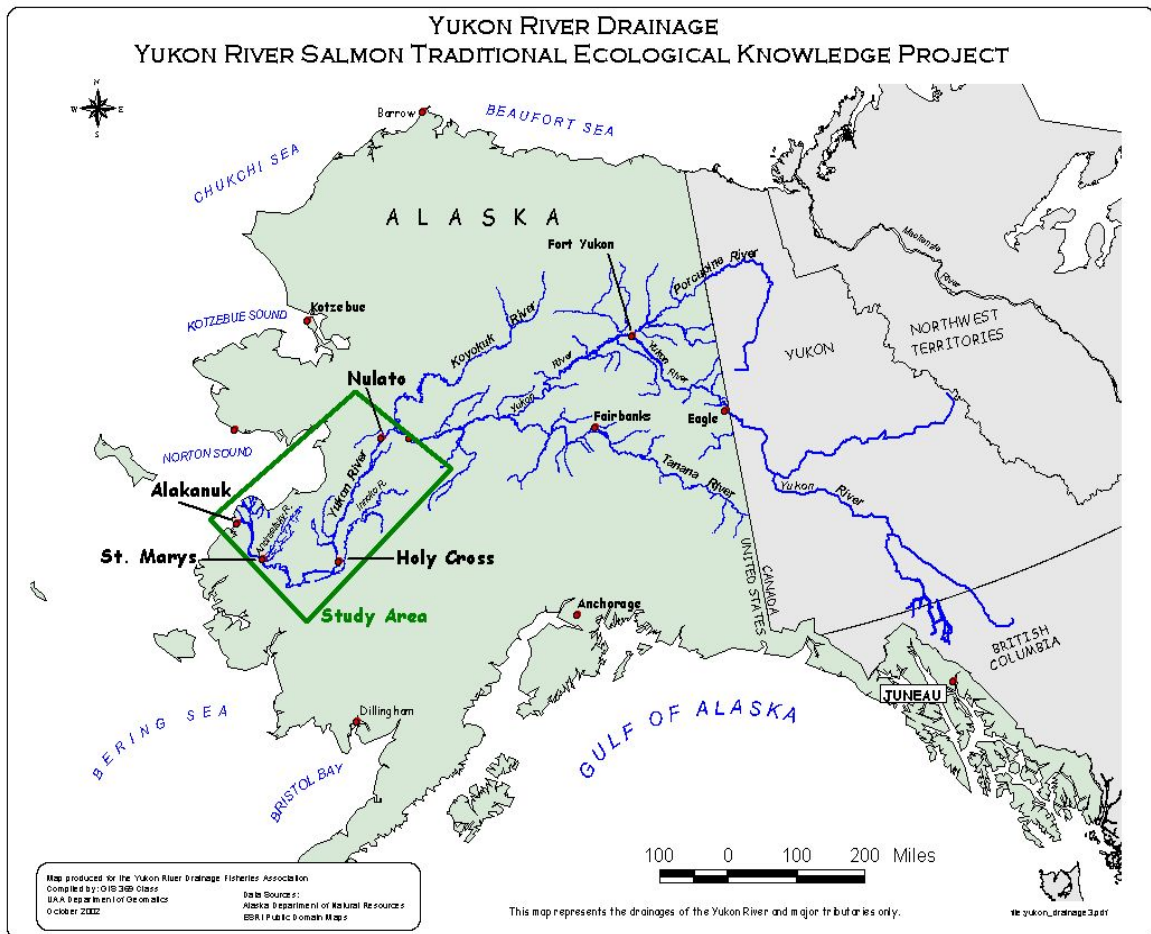


Figure 2. Study Area

SAINT MARY'S- The next community, Saint Mary's is located approximately 88 miles upstream from Alakanuk (AK Atlas and Gazetteer 2000) on the north bank of the Andreafsky River, five miles from its confluence with the Yukon River. This region has the first gravel beds or spawning grounds for salmon. The Andreafsky River flows north of the Yukon River. The relief of the area between the Andreafsky and Anvik rivers has a rolling aspect with the highest point being 2,700 feet. The rest of the area can be considered an extensive area of low-lying land contiguous to the Yukon River on its east and south sides (Harrington 1918). Immediately adjacent to the Andreafsky River are the Andreafsky Hills. The Andreafsky River has two main forks (Harrington 1918). The City of Saint Mary's encompasses the Yupiit villages of Algaciq and Andreafsky. Andreafsky was established in 1899 as a supply depot and winter headquarters for the Northern Commercial Company's riverboat fleet (DCED 2002). Saint Mary's is a Yup'ik Eskimo community (Krauss 1984) whose residents maintain a lifestyle of fishing and subsistence activities (Williams 2000).

HOLY CROSS- Approximately 179 miles upstream from Saint Mary's (AK Atlas & Gazetteer 2000), is the community of Holy Cross, on the west bank of Ghost Creek Slough off the Yukon River. It is 40 miles northwest of Aniak. In Holy Cross, the Yukon River is ice-free from June through October (DCED 2002). Just below the village of Holy Cross, on the opposite bank is the mouth of the Innoko River, the fourth longest tributary of the Yukon. Below the village of Kaltag and upstream from Holy Cross, the Yukon River enters a physiographic region characterized as the Innoko Lowlands, made up of flat river flood plains (Vanstone 1979). The Innoko Lowlands are located between Shageluk Slough in the north and the mouth of the Innoko River in the south. Also included in this environmental feature is the Anvik River drainage. The Innoko River drainage meanders through a vast lowland region used by the Yukon Deg'Hitan. In the Innoko lowlands there are numerous navigable rivers, which played a dominant role in the culture of the local people, providing access to food and facilitating communications. There are no high mountains or large lakes (Vanstone 1979). Holy Cross is primarily an Athabascan community although some of its residents are also Yup'ik Eskimo (Krauss 1982). Subsistence and fishing-related activities are very important to its residents (Williams 2000).

NULATO- The most upstream community in this study is the Koyukon Athabascan village of Nulato, located in the Nulato Hills, approximately 201 miles upstream from Holy Cross (AK Atlas and Gazetteer 2000). Nulato is located on the west bank of the Yukon River, 35 miles west of

Galena, across the river from the Innoko National Wildlife Refuge. In the Nulato area, the Yukon River is ice-free from mid-May through mid-October (DCED 2002). The Nulato Hills are northeast trending ridges of one to two thousand feet with rounded summits, gentle slopes, narrow valleys and flat, trenched floors. Gullies occur five hundred to 15 hundred feet apart. Streams to the east flow into the Yukon River, those on the west flow into Norton Sound (Stephenson 1979). The Kaiyuh Slough part of the Innoko National Wildlife Refuge is an important area for the Nulato Koyukon as they primarily lived along the tributaries and backwaters of the Yukon. The areas east of the Yukon and west of Kaiyuh Hills are made up of swampy lowlands (de Laguna 2000). Nulato is a Koyukon Athapascan community (Krauss 1984) whose residents rely on subsistence fishing for their livelihood (Williams 2000).

Community	Ice-free period in the Yukon River
Alakanuk	June through October
Saint Mary's	June through October
Holy Cross	June through October
Nulato	Mid-May through mid-October

Table 1. Ice-Free Period in the Yukon River

About 43 villages with a total population of approximately 21,000 rural residents, excluding the greater Fairbanks area (approximately 84,000 residents) are located within the Alaskan portion of the Yukon River drainage and along the Bering Sea coast. Most of these people are dependent, to varying degrees, on fish and game resources for their livelihood (Williams 2000). Village populations range from approximately 30 to 800 people, with most villages having fewer than 300 residents. Most villages have a population consisting primarily of Alaska Native people who have a living history of dependence on salmon resources (Klein 2001). All residents of the Yukon River rely heavily on salmon for subsistence. If the fish are not doing well, then the people and their lifestyle are not doing well. The fish deliver nutrients to the ecosystem that people and animals depend upon. The salmon are essential to the environment, the people and the animals. Poor fish returns since 1998 have significantly affected all communities.

Community Descriptions

ALAKANUK- In 2000, Alakanuk had a population of 652 people, 97.9% of which were Native. The community residents have a seasonal economy with most activities occurring during the summer (DCED 2002). In 2000, there were 81 households which participated in the subsistence salmon harvest (Vania et al. 2002). Seventy-six residents hold commercial fishing permits. Many have gill net permits, and set net fishers sell their salmon. Tribal government employment and retail businesses are some of the only year-round employment. Salmon, beluga whale, seal, moose and rabbit are some of the food sources residents take advantage of. Many residents travel to Emmonak to shop, attend social events and basketball tournaments (DCED 2002).

SAINT MARY'S- According to the 2000 Census, Saint Mary's had a population of 500 people, with 87.6% of the community members considering themselves to be Native. The economy in Saint Mary's has seasonal fluctuations with employment peaking during the summer fishing season. Sixty-five residents hold commercial fishing permits (DCED 2002). In 2000, there were 88 households which participated in the subsistence salmon harvest (Vania et al. 2002). Cash income is supplemented by subsistence activities and trapping with salmon, moose, bear, and waterfowl being harvested (DCED 2002).

HOLY CROSS- Holy Cross first had contact with Europeans in the early 1840s, when Russian explorers led by Lt. Zagoskin traveled the Yukon River. In 1912, the name of the town was changed to "Holy Cross," after a mission established there. In the 1930s and 40s, sternwheelers brought the mail and supplies two or three times a year. The course of the river changed during the 1930s, and by the mid-40s, the slough on which the village is now located was formed. Holy Cross is a Deg'Hitan Athapaskan village of 227 people in the 2000 census with 96.5% of the community members considering themselves to be Native (DCED 2002). In 2000, 37 households participated in the subsistence salmon harvest (Vania et al. 2002). Subsistence and fishing-related activities are important as Holy Cross has a seasonal economy peaking in the summer. Nine residents hold commercial fishing permits and subsistence hunting, fishing, trapping and gardening supplement income (DCED 2002).

NULATO- Nulato had a population of 336 in the 2000 census with 94% of the community members considering themselves to be Native (DCED 2002). The Koyukon Athabascans traditionally had spring, summer, fall, and winter camps, and moved as the wild game migrated. Nulato was the trading site between Athabascans and Inupiat Eskimos from the Kobuk area, north

of the Seward Peninsula. Western contact increased rapidly after the 1830s. The Russian explorer Malakov, a Creole, explored the Yukon as far north as Nulato and built a small trading post at Nulato in 1839 to cut off Koyukon trade with the Eskimos of Norton and Kotzebue Sounds (Clark 1981). Nulato residents are predominantly Koyukon Athapascans, with a trapping and subsistence lifestyle. Most of the full-time employment in Nulato is with the City, school, clinic and store. During the summer, Bureau of Land Management (BLM) emergency fire-fighting positions, construction work and fish processing are important sources of cash for Nulato. Twelve residents hold commercial fishing permits (DCED 2002). In 2000, 50 households participated in the subsistence salmon harvest (Vania et al. 2002). Trapping is Nulato's largest private sector income source in winter. Subsistence foods are a major portion of the diet, and many families travel to fish camp each summer. Salmon, moose, bear, small game and berries are also utilized. Poor fish returns in the past two years have significantly affected the community (DCED 2002).

<u>Community</u>	<u>2000 Population</u>	<u>Alaska Native Group</u>	<u>Commercial Fishing Permit Holders</u>
Alakanuk	652	Central Yup'ik	76
Saint Mary's	500	Central Yup'ik	65
Holy Cross	227	Deg Hit'an Athapaskan	9
Nulato	336	Koyukon Athapaskan	12

Table 2- Community Description

The Salmon Fishery

For Alaska Native groups living along the Yukon River, fishing means more than just food; it is part of a traditional, cultural, and economic system that forms the basis for intrinsic self-esteem (Berger 1985). All five species of Pacific salmon are found in the Yukon River drainage: king salmon (chinook), chum, and coho salmon predominate in the river (Vania et al. 2002) and the Yukon River has the highest per capita salmon harvest in Alaska. The Yukon River fishery is comprised of subsistence, commercial, sport and personal-use fishers. Subsistence fishing activities are based either from a fish camp or home village. Extended family groups, which represent two or more households of several generations, often work together to harvest, cut and preserve salmon for subsistence use. A significant portion of the salmon harvested are frozen, dried into strips, or smoked for later human consumption (Vania et al. 2002). Subsistence fishing provides a reliable source of sustenance to counterbalance other fluctuations in the natural environment and local economy. Not only do people catch fish for their personal consumption, but also to satisfy

commercial markets. Commercial fishing and subsistence fishing activities are strongly inter-related on the Yukon River. Income from commercial fishing is used to pay for expenses and costs of subsistence fishing, and hunting and gathering activities. The first recorded commercial salmon harvest in the Alaskan portion of the Yukon River drainage occurred in 1918 and over 90% of commercial fishermen and women are residents in villages along the Yukon River drainage (Holder and Senecal-Albrecht 1998).

Early exploration by people such as Zagoskin ([1847] 1967) attest to the importance of subsistence salmon harvests to people living in the Yukon River drainage. Historical accounts document the use of large salmon harvests to support dogs, used as draft animals for transportation and packing. Around 1930, the airplane began replacing the sled dog as a primary mail and supply carrier. This technology change contributed to a gradual reduction in the need for subsistence salmon for dog food. The introduction of snow machines during the 1960s accelerated the decline of sled dogs and thus the need for subsistence salmon harvests to feed them (Borba and Hamner 2001). Sled dogs are still used in certain parts of the drainage and salmon are harvested for dog food.

Yukon Area subsistence fishers use drift gillnets, set gillnets, and fish wheels to harvest salmon (Vania et al. 2002). Set gillnets are used throughout the Yukon area. Drift gillnets are only legal for subsistence salmon harvests from the mouth to 18 miles below Galena, or Yukon River mile 514 and are used extensively in this area. Fish wheels are legal throughout the drainage but they are mainly used in the Upper Yukon Area where an ample supply of wood for construction and operation is available. The season is from late May to Early October with the edge of season being dependent on ice conditions on the river (Borba and Hamner 2001).

The Yukon River has generally supported both subsistence and commercial fisheries until most recently, when there have been low salmon returns to the drainage. During the 2000 fishing season, the chinook, summer chum and fall chum runs returned at record low levels to the Yukon River. Commercial and subsistence fishers suffered a terrible year and it was subsequently declared a disaster by the state and federal government. The 2000 chinook return was the third year in a row of poor returns which started with the 1998 disaster. The 2000 summer chum and fall chum returns were the fourth and poorest year in a row; chum began declining in 1997 after three years of large returns (1994 through 1996) (Senecal-Albrecht 2000).

Harvest Rates

Subsistence salmon fishing activities in the Yukon drainage mainly occur from late May through early October, dependent on ice conditions. The chinook begin entering the mouth of the Yukon River soon after ice breakup, during late May or early June and continue through mid-July. The majority of the large chinook salmon (greater than 21 inches in length) are reserved for human consumption. Although a large proportion of the small chinook salmon are also used for human consumption, a significant proportion of the small chinook salmon, or “jacks”, are used for dog food (Vania et al. 2002). The chum salmon return has two genetically distinct runs; an early summer chum salmon run and a later fall chum salmon run. Coho salmon enter the Yukon River from late July through September. Pink salmon enter the lower river from late June to late July, spawning in the lower portion of the drainage downstream of Grayling. Sockeye salmon are uncommon in the Yukon River drainage with only a few individuals caught each year (Vania et al. 2002).

Holder and Senecal-Albrecht (1998) estimate the annual subsistence harvest needs in the Alaska portion of the Yukon River to be, by species, 50,000 chinook, 234,000 summer chum, 184,000 fall chum, and 45,000 coho. They came to these numbers based on ADFG historic harvest data numbers (1981 through 1994) with the 5 lowest harvest years removed. They point out that it is important to use care when using past harvest levels to define overall subsistence needs as harvest anomalies such as regulatory closures, unusually poor runs and weather events that interrupt the harvest should be removed from the equation. Borba and Hamner (2001), in *Subsistence and Personal Use Salmon Harvest Estimates Yukon Area, 2000*, describe the number of salmon taken that year as being a total of 36,479 chinook, 78,102 summer chum, 19,396 fall chum, and 14,939 coho in the Alaska portion of the drainage.

Definition of Traditional Ecological Knowledge (TEK)

For the purpose of this study TEK refers specifically to all types of knowledge about the environment derived from the experience and traditions of a particular group of people. Using the term “traditional,” risks implying a static or archaic form of knowledge that is inherently nonadaptive, whereas the acute observations and sophisticated knowledge that some aboriginal people have of their environment are both evolving and current. From a Western science perspective, TEK includes empirical facts or associations based on observation and experience,

explanations of fact, a culturally specific way of organizing and understanding information, a set of values, and cultural norms about how to do things. From a Native perspective, TEK is what people learn from experience, from their family and their community, and from stories handed down about how to live fully and experience their environment. TEK is both knowledge of how things work and a guide to action (Usher 2000:186).

A local perspective is important for this project because the salmon runs follow ecological fluctuations over time. The lives of people living along the Yukon River have been interwoven with the water and the salmon. The people of the Yukon River have witnessed many changes taking place over time. Documentation of this observational knowledge, referred to as TEK, is “the system of experiential knowledge gained by continual observation and transmitted among members of a community, set in a framework that encompasses both ecology and the interactions of humans and their environment on physical and spiritual planes” (Huntington 1997).

It is important to the local Alaskan people that this ‘traditional’ knowledge be documented as elders are passing away and their knowledge goes with them if it has not been transmitted to others in the community or recorded properly. Local people want to be listened to and feel that their knowledge is valuable (Klein 2001). This study is an attempt at doing just that.

Importance of TEK

Science and traditional knowledge provide two distinct approaches to knowledge, developed in two different institutional settings and based on markedly different premises. The fact that they overlap in specific instances does not mean that one should subsume the other, but rather that there is a possibility for exchange. At a philosophical level, it can be argued that oral tradition and science are each capable of contributing to an overall field of knowledge, that knowledge has both linguistic and cultural components. The most effective and continuing interdisciplinary programs in the north are found in areas where Native communities are very much involved in the projects. Approaches such as these greatly narrow the gulf between local people and ‘outside’ experts (Cruikshank 1981:86). Examples in the north include the Government of the Northwest Territories, who adopted a Traditional Knowledge Policy, recognizing that traditional knowledge is a valid and essential source of information about the natural environment and resources, the use of natural resources, and the relationship of the people to the land and undertook to “incorporate traditional knowledge into Government decisions and actions where appropriate” (Usher 2000).

But TEK does not need to be of great antiquity to be valid or useful. New and evolving environmental knowledge may also contribute to environmental assessment (Usher 2000). People who are dependent on local resources for living are often able to assess the true costs and benefits of development better than any evaluator coming from the outside. They retain a record of what the land and resources have provided and are the first to see the changes (Berkes 1999).

New scientific knowledge can be derived from perceptive investigations of traditional ecological knowledge, particularly in the north where local knowledge often exceeds that of the Western scientist restricted by a seasonally limited research period. Northern field researchers have drawn upon the knowledge of their local assistants and this has been recorded and acknowledged by researchers since Freeman's work with the Inuit of Belcher Island in 1970 (Berkes 1999).

Recent TEK Studies

Other TEK studies conducted recently along the Yukon River include a study in Eagle and Circle collecting verbal and spatial subsistence information on two anadromous and four freshwater fish species: chinook salmon, chum salmon, northern pike, arctic grayling, whitefish, and burbot. The researcher attempted to collect information about presence, abundance, habitat, and harvest of the above mentioned fish species (Fox 2002). Fox found that respondents believe humans have affected fish populations (78%); fish are less healthy currently than previously, commercial fishing negatively affects fish populations (95%), and that no fish are wasted in their villages. The interview team conducted 21 interviews in these communities but found that their spatial data collection goals were not as successful as anticipated (Fox 2002).

Another study, conducted in the Yukon Flats by Dave Andersen and Craig Fleener (2001), looked at a relationship between beaver and whitefish ecology. In Andersen and Fleener's study, lifelong residents of the Yukon Flats area were identified as experts and interviewed as a source of TEK on whitefish and beaver. They found consensus that significantly fewer whitefish are harvested on the Yukon Flats today for a variety of reasons. Even with reduced harvest levels, most residents believe that whitefish populations have declined. This decline could be due to high beaver populations or a reduction in the harvest of beaver but it is unclear. They talk about changing ecology of the Yukon Flats as being responsible and Andersen and Fleener (2001) conclude with suggestions for further studies.

METHODOLOGY

The study began with a focus group meeting in Holy Cross in the spring of 2001 during the Yukon River Drainage Fisheries Association annual meeting. This discussion provided guidance for the project and led to a directory of knowledgeable people and a short list of questions on which the semi-directed interviews were based.

A total of 29 people were interviewed. Interviewees ranged in approximate ages from 40 to 80 and were of Yup'ik Eskimo, Deg Hit'an and Koyukon Athabascan descent. All participants were selected based on their knowledge and through recommendations from their tribal councils, Yukon River Drainage Fisheries Association (YRDFA) board members and other members of the individual communities. They were recommended because they were well known in their community as active fishers either currently or in the past and were knowledgeable about salmon and well-versed in their cultural customs. As Usher notes, (2000:188) with regard to selecting candidates to interview, "some persons are more knowledgeable and experienced and wiser than others, and they are widely acknowledged as such in their communities."

Interviews

The interviews took place in a setting comfortable for the participants, which meant mostly in their homes or at their fish camps. Most of the interviews were conducted in English with the exception of Alakanuk where two interviews were conducted in Yup'ik. When the participants preferred to use their Native language, an interpreter who assisted with interviews was hired.

For each participant, the project was described and a consent form (see Appendix B) was reviewed before beginning the interview. In addition, in some cases, the interviews were recorded with a video recorder if permission was granted. Some participants did not want to be video taped and their interviews were tape-recorded. Some participants did not allow tape or video recording yet still were willing to participate. These interviews were recorded through note taking by the interviewer.

Each participant received an honorarium to compensate for their time, effort and sharing of valuable information during the first visits in the summer of 2001. Most of the participants were revisited in 2002 to review their draft interview summary. At that time they were also given an update on the project. The participants we were able to revisit and briefly review the draft materials with received an additional small honorarium.

From the Holy Cross meeting, an interview guide containing eleven questions was developed to assist the interviewer using a semi-directive format. Participants were asked where and for how long they have fished for salmon; what kind of fishing gear they use/used for salmon; when the kings arrive in their area; and what affects their arrival time. They were also asked if they could remember any years that the king salmon arrived especially late or early; and if there were any years in their memory that were especially strong or weak. They were asked how the kings position themselves in the river and if there are different stocks of kings in the area. Finally, there were questions about the health of the salmon, the size and their spawning locations. These questions can be found in Appendix A. The key respondent interview guide allowed the interviewer to ask questions and take notes while the participant was speaking. A semi-directive interview format was used because it gave a general direction for the discussion yet allowed for diversions or related discussions to be initiated by the participant and encouraged by the interviewer. Related discussions were encouraged and the interviewer probed to get further information or to better understand an answer or comment.

Local assistants were hired in each village to make introductions, to assist with getting to participants' houses or fish camps and to facilitate the interviews. Although the original intent was for the local assistants to play a strong role in the interviews, most of the local assistants were more comfortable in a passive role during the interviews. Nulato was the exception; the local assistant was well versed in the subject and played an active role in the interviews. He was able to remind participants of related relevant information he knew they were aware of. This approach was particularly effective.

Maps were used to record the areas that people fish or fished in the past. Most of the interviews included some time with a map, pointing out fish camps, and fishing and spawning locations. This information was recorded using acetate overlays on USGS 1:250,000 quadrangle maps. The interviewer found the maps difficult to use and put them away if they didn't seem to work in an interview. Students in the fall 2002 Land Information Systems class of the University of Alaska Anchorage GIS Program digitized the maps by using the acetate overlays and through narrative information provided by the project coordinator for inclusion in this report.

Organization of Report

The findings in this report are organized first by topic and then by village. Each topic within the findings section is headed with an underlined title. Excerpts from the interviews are included within the report, summarized within the findings section. The excerpts are coded for each individual by village to maintain confidentiality, for example “SM-1” would indicate one of the participants from Saint Mary’s. Themes were pulled from data as consensus or conflicting information arose. The appendices include full summaries of the interviews.

In addition to this written report, a video about TEK on the Yukon River was produced. The video was formatted utilizing the voice of the participants, village by village. Two hundred copies of the video were produced; these copies were distributed to all the secondary schools within the Alaska portion of the watershed, tribal councils, project participants, local assistants and state and federal agencies.

FINDINGS

Participant Longevity in the Area

Specific age information was not collected from the participants but we do know that they ranged in age from 40 to 80. We tried to interview a mixture of elders and active fishers who were knowledgeable about salmon. Most of them have fished in their village area for their whole lives. They were recommended to us because they are well known in their communities as being knowledgeable about salmon. Many of the participants in all of the villages learned to fish from their parents and their knowledge comes from generations in the area.

Fishing Locations

ALAKANUK – The participants fish or fished in areas such as Flat Island, the old town site near Jack Emel’s cannery, in the slough, on the Yukon and near Manning Island (Figure 3). They also fished in Kwiguk Slough, at Ulgy’s Point or Waskey Point, near Fish Village and at Big Eddy. The youngest person interviewed as part of this project had been fishing in the area for roughly 30 years while the couple with the most longevity in the area had been fishing for roughly 50 or 60 years.

SAINT MARY’S – Participants fished at Old Andreafsky, below Pitkas Point, near the Boreal Fishery, and between Pilot Station and Mountain Village (Appendix C). Many of the participants in

the Saint Mary's area mentioned that they have been fishing these sites since at least the 1960s. Some of them have fished in these areas since they were children and one participant indicated that s/he had been fishing the area for at least 18 years.

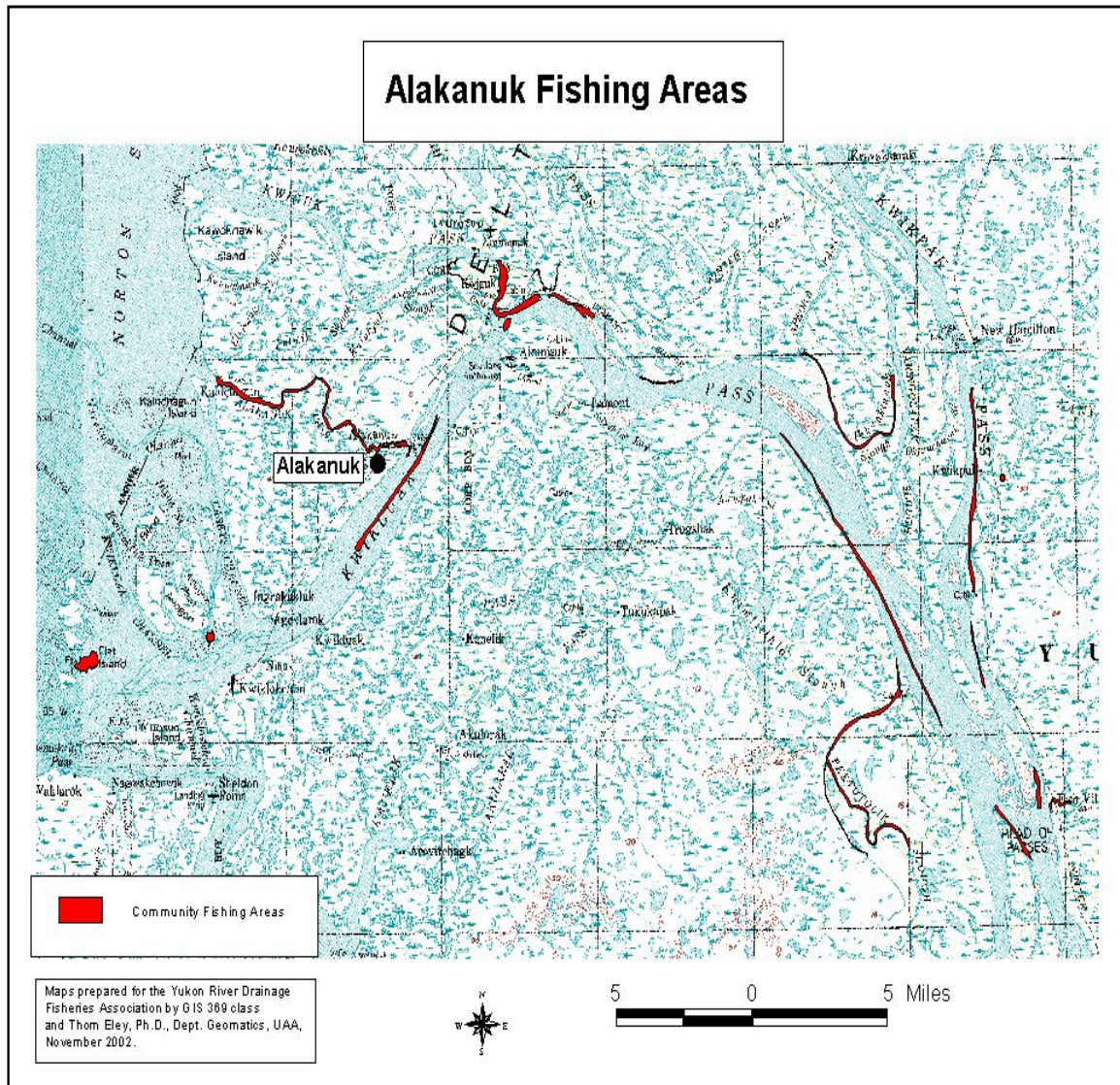


Figure 3. Alakanuk Fishing Areas

HOLY CROSS - The participants mentioned fishing at areas such as Paimut, the Holy Cross area, Victors, the Yukon River above the Innoko River, above Walker Slough, Patsy Island and below Holy Cross (Appendix C). Some of them have been fishing the area since the late 1920s or 1930s. Others started in the late 1960s or early 1970s.

NULATO - Project participants have been fishing at Nine Mile Camp and the nearby areas, on the Yukon River and inside the slough (Figure 4). They also fished at Four Mile Island, Two Mile Island, at the Bluff, Patsy Slough, Three Mile, Halfway and Nulato Island. All of the participants in Nulato said that they have been fishing these areas since they were children during the last 50 or 60 years. One person mentioned that his/her fish camp has been in his/her family for generations.

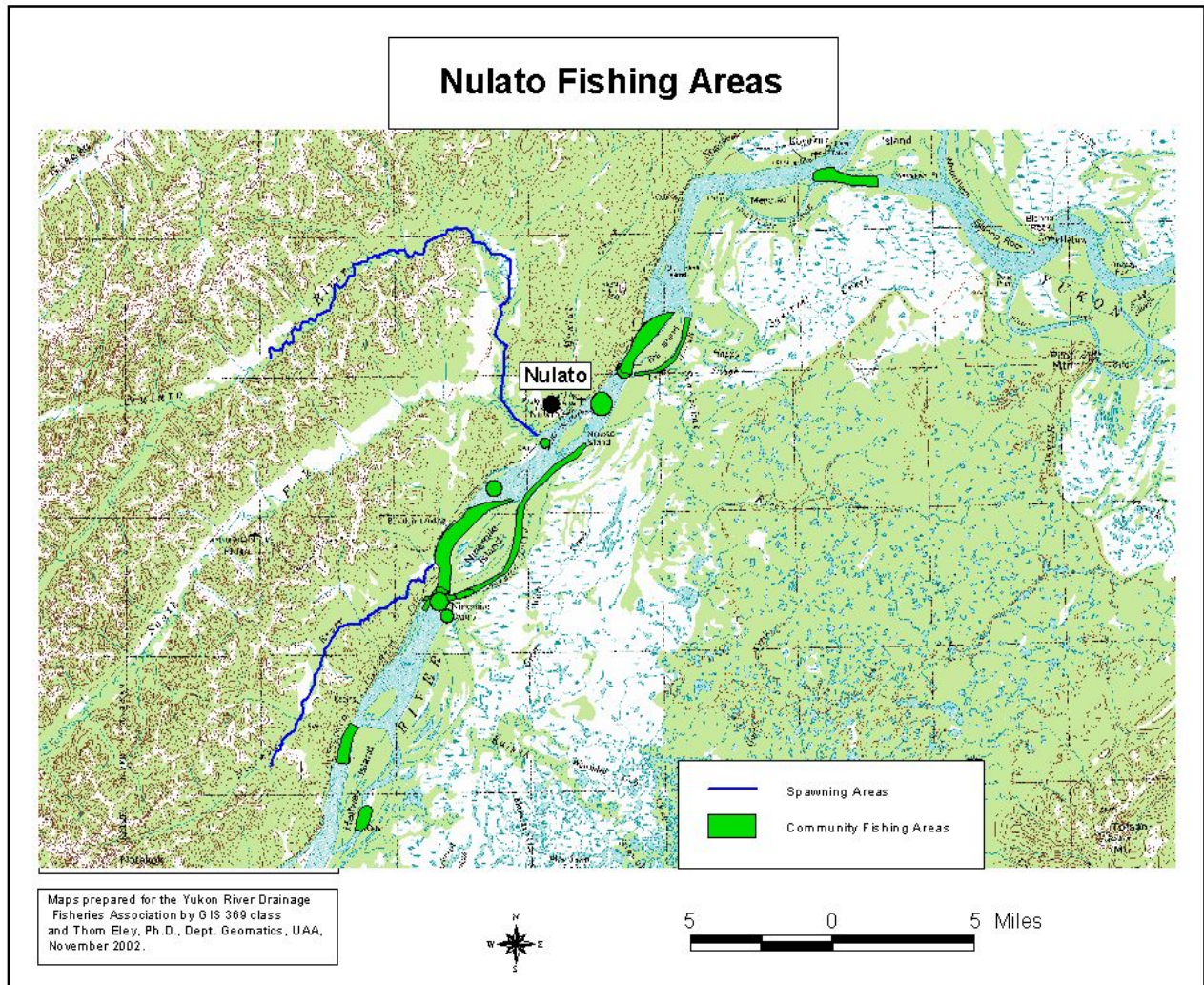


Figure 4. Nulato Fishing Areas

Importance of Longevity at a Fishing Site

Many participants mentioned the importance of their longevity at a fishing site and year round observations in developing their understanding of their environment as compared to summer ADF&G staff who are only able to observe for a short time period in a given year.

*“Listen to our elders, these elders have been here for many, many years....
We are here year-round...” (SM-3).*

The selection of a location for fish camp seems to be influenced by a number of factors, for example: availability of sites, eddy sites, fresh water, easy boat access, a river bend or a smokehouse. One family described a move they made 18 years ago when their children were small. Their previous fish camp location was unsafe for small children running around.

*“With our kids wandering around all over, we didn’t want any accidents to happen”
(SM-3).*

A participant was invited by another fisher to join him at their current fishing site, which the participant has now been using for almost 40 years. He described how one gets to know their fishing area and, over time, becomes an expert at reading the channels and shallows.

“One of the reasons I’ve been here is I know where the fish will be. If I move to another spot, I’d have to reorient myself to that environment and find out where the fish are coming to and where they are heading..... If the river changes, the fish change. It’s good to know the river and the area” (SM-4).

Some fish camps are passed down through the family, transferred from one member to another depending on need and permission. Participants described how to find a new location if you need to change sites. One participant revisited places he went as a child to select a new location. Sometimes others may take over a good fishing location and a new location must be selected by the previous fishers of that site. Participants described how another fisher had taken their site and they chose to move rather than to fight about it.

“When you have a good fishing spot people will take it from you. We lost ours at Nine Mile Island. We lost it because we don’t want to argue and fight over it. We never say anything, we just feel ugly inside. But we can always find another spot” (N-3).

This kind of situation could be used as an opportunity to improve on the location such as moving closer to the village.

“Then we fished at another spot that [he] fished at when he was a little boy. That’s how we found that spot. After we lost our fishing spot we started looking around for another place. We tried this place and we had 10 kings the next morning. We felt really good about finding a place so we’ve been hanging on to it for a while now. More than 3 years. It’s much better and cheaper because we don’t have to run all the way down to Nine Mile Island” (N-3).

Fish Camp Dynamics

Some of the elder participants discussed their changing role in the subsistence fishery as they age. As it becomes difficult to get around, sons or other relatives may bring the fish to their older mother or grandmother who continues to cut fish, sometimes acting as the main processor for the household, cutting hundreds of salmon every season.

“We haven’t fished for the last ten years..... The boys get us fish and [she] cuts fish at fish camp” (SM-1).

People seem to spend less time at fish camp now than they did in the past. Reasons given for this include preference for modern conveniences and the inconvenience of changing fishing scheduling as the following passages indicate.

“We lived up in camp. Now we go up there, cut fish and come home. We don’t stay up there. It’s too buggy” (SM-4).

“The fishing schedule makes it hard to stay at camp because it’s a long way to go” (N-5).

Other important dynamics participants spoke of include multiple families sharing a fish camp and sharing the first fish caught.

“Families fish together, three whole families fished with us. The first people to get fish share it with everyone. That’s our tradition. We share with the elders first” (N-2).

Type of Gear Used

Anchored at both ends, set nets are usually 150 feet or less and work best at the edge of an eddy where the net will not so readily catch floating debris. Drift nets are longer (300 feet or less) and are attached to a boat that drifts downriver with the current. This method calls for a somewhat long, straight, snag-free stretch of river (Alaska Department of Fish and Game 1988).

Some of the participants discussed the most successful locations for fishing for a particular run of fish or sites that were good for a particular gear type. All of the participants mentioned that they set net or drift for salmon. They use standard nylon net sizes for king salmon. Some mentioned that in the past they made their own nets or used cotton nets that needed to be dried to avoid rotting.

“We use the same gear every year. We just mend them and make sure that they are useable for next season before we break our camp. They’re expensive, it’s hard to buy new nets every year so we salvage them, mend them and hang them ourselves to save money and make ends meet” (SM-4).

In Saint Mary's, most people drift for king salmon. In Holy Cross, many people mentioned drifting but they also talked about set netting and using fish wheels. Logs floating downriver are a problem for the set netters in this area. Some people in Holy Cross seem to use smaller nets, such as 7 ½ or 7 ¾ inch nets. In Nulato, people mentioned set netting much more frequently than drift netting and the majority of participants interviewed seine for salmon.

Fish wheels were brought up frequently in the upriver villages. In Nulato, all the participants talked about the fish wheels and many had used them within the past few years. Some mentioned that they stopped using them because of changing regulations and others because the river changed its bars and channels making the fish wheel less effective in the deeper water.

Arrival Times of King Salmon

Ted Spencer, a fish biologist at the Alaska Department of Fish and Game has calculated an average travel time for radio tagged salmon. He has obtained an average speed of 53 km per day, taking into consideration that salmon destined for various tributaries seem to travel at different speeds and salmon seem to travel at different speeds in different sections of the river. Thus, using these averages and qualifiers, we can say that a salmon traveling from Alakanuk to Saint Mary's takes 2.7 days to travel the 90 miles, Saint Mary's to Holy Cross takes 5.2 days to travel the 172 miles and Holy Cross to Nulato takes 6.2 days to travel the 205 miles (Spencer personal communication 2003).

All the participants were asked when the king salmon arrive in their area. The arrival time of the king salmon is connected to elements of nature such as the break-up of the ice on the river or other aspects of weather. Run size, water temperature, and wind direction are all elements that affect when the king salmon arrive. Quite simply, people stated that when break-up is early, the kings will come in early; when break-up is late, the kings will come in late. The participants had a lot to say about the winds, particularly in the villages closest to the mouths of the river.

ALAKANUK - Participants said that the king salmon arrive after break up in early June or the end of May. They said that as a general rule, the fish arrive five to seven days after the ice moves out; they may arrive as early as the 25th of May. Two people said that the main run arrives around June 23rd or between the 20th of June and the 27th of June. Once this main run arrives, it runs consistently for 3 days. When the kings arrive in May they are considered early. They sometimes arrive on May 26th or May 28th. When they don't arrive until the middle of June, they are

considered late. Some even consider the 3rd or 4th of June to be late but others say that anytime in the early part of June is normal. One participant pointed out that the salmon arrival times are always changing.

Salmon come in when it's cold, cloudy, wavy and windy. As the village closest to the mouth that we interviewed, people in Alakanuk had the most to say about the winds. People said that stronger winds produce greater numbers of fish and lesser winds resulted in weaker runs of salmon. In addition, participants indicated that the weather direction affects when they arrive and wind direction affects which mouth the salmon enter. South and east winds encourage more kings to enter the north or middle mouths of the Yukon. North winds cause fewer kings to enter the north mouth; instead kings enter the south mouth. West or southwest winds cause the kings to enter the south mouth. People also claimed that the tide has an effect in conjunction with the winds. When a south wind changes to a west wind and the tide comes up, the fish will enter the south mouth.

SAINT MARY'S - The participants varied in their opinion of the standard arrival time of the king salmon over a three-week period, the first, second or third week of June. One said they arrive 3-4 days after they arrive at the mouth. It is generally a week and a half to two weeks after break-up when king salmon arrive. Only two people said they may arrive in late May. Pretty much all agreed that the fish would be there by the 13th of June. May is considered early for the salmon to arrive but one participant points out that several times he has caught all his fish before the end of May. Most participants in Saint Mary's consider the first week of June to be early but one considers the 3rd week of May to be early. Participants commented on the size of the run affecting arrival times in their area, explaining that a larger run will travel slower than a smaller run. According to participants, a smaller run takes around 3 to 3 ½ days for the salmon to arrive from the mouth. One participant said that when there is a cold north wind blowing, the fish are smaller. Another said that a warm spring makes the fish arrive early.

According to participants, the current can also affect when the kings arrive. If the current is slower, the kings will swim faster. They explain that this is related to the size of the school; small schools travel more quickly than larger schools.

"It usually depends on the size of the run. When they are in small schools they swim faster, about 3 to 3 ½ days from the mouth to here. When they are in big schools of fish they take longer, they swim slower up the Yukon. When the current is slower the fish swim faster" (SM-3).

HOLY CROSS - Participants remembered the arrival of king salmon as varying each year from about the 5th of June until the 23rd of June. One person said that the 14th of June would be considered late. The 2nd or 3rd week of June is normal and before that is early. Although one participant said that the end of May would be early and another remembers three times that the fish came in May. People also pointed to break-up affecting king salmon arrival. Participants from stated that the wind could keep the ice at the mouth of the river, stopping the kings from entering.

NULATO - Most participants agreed that the kings would start arriving between the 9th of June and the 15th of June and they would run until early July (Figure 5). Some remember the fish starting to run around June 8, 9 or 10. Others consider June 15th to be early and June 20th to be late. Finally some feel June 25th is a normal time for salmon to be running (See Figure 5). Participants also correlate the arrival time of the salmon with the timing of break-up.

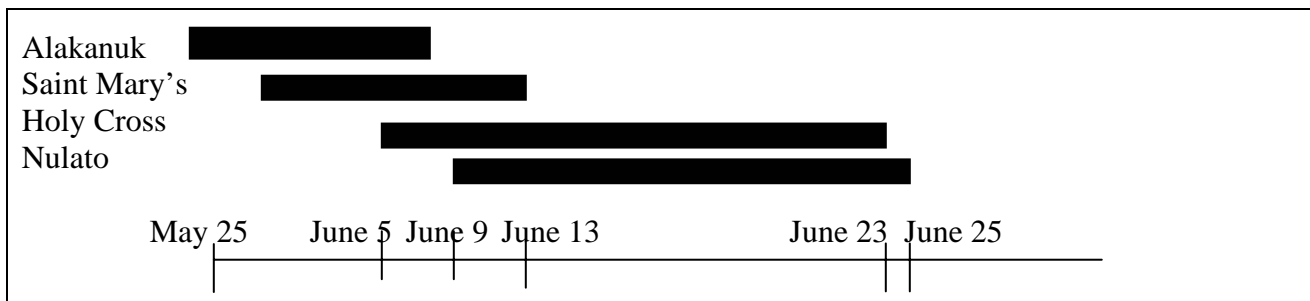


Figure 5. King Salmon Arrival Timeline

Legend of King Salmon Swimming under the Ice

Participants expressed a variety of opinions over whether or not salmon swim under the ice. In Alakanuk, one participant said that he had never seen a king salmon caught under the ice in the spring. In Saint Mary's, one participant seemed mildly sure that salmon don't swim under the ice. But in Holy Cross, three participants commented that they didn't know for sure but felt that it was possible that salmon do swim under the ice. One couple in Holy Cross referred to a year that they caught a king salmon on May 26th. They felt sure that it must have swum under the ice. Another year they caught 17 salmon before anyone at the mouth had caught salmon. In this case they felt quite sure that these kings had swum under the ice. Another participant in Holy Cross referred to the May king salmon as the 'ice king salmon'. Finally, a participant in Holy Cross explained that this is a mystery because it is so difficult to get out on the water when the ice is breaking up. Those who believe that the salmon swim under the ice base it on the fact that upriver communities have sometimes caught many fish before the downriver communities have any fish. They wonder, "How

could this happen unless the salmon swim under the ice?” Most participants in Nulato said that the salmon do not swim under the ice, but one did hear that they do swim under the ice at the mouth.

Traditional Indicators of King Salmon Arrival

People continue to refer to and rely on traditional indicators of king salmon arrival. In Saint Mary’s one participant discussed the indicators he relies upon to know when the salmon will arrive. He was taught by his elders to watch the geese because the kings arrive in conjunction with the geese; if the geese come early then the kings will come early and if there are more birds then there will be more king salmon. In Holy Cross one participant watches for “fish birds”, which are little dark birds that let him/her know when the kings will arrive. S/he also looks for blue bells, which come out when the kings are arriving.

Communication

Word passes from village to village when the salmon are arriving. This allows the upriver communities to prepare.

“In the past we always heard [about the arrival of the fish] from word passed from village to village from Nunam Iqua or south mouth. Usually that’s an indicator that they will be here in three or four days. We always aware and listening to other villages in the lower part of the Yukon River. It’s always been like that” (SM-4).

Once people in Saint Mary’s hear that the people downriver are catching salmon, they put their nets in the water. Participants in Holy Cross also listen to what is happening downriver, since they know that later they will be catching kings in their area. In Nulato, participants referred to the importance of inter-village communication as a way of knowing when the salmon will arrive.

Run Strength

ALAKANUK - People reported that today king salmon are decreasing in numbers. People said that twenty-five years ago there were few salmon, but they were heavy around 1964. The king runs were good from the 1960s through the 1980s but once the 1990s arrived, king salmon runs declined (Figure 6).

SAINT MARY’S - People said that the king salmon runs were good in 2001 and were strong in the past. Some people said that the 1970s were heavy king salmon years but there have been declines since then. 1996 was a low year but 1998 to 2001 there were more kings. They

frequently compared the previous year with the current one saying that there were more king salmon in 2000 than in 2001.

HOLY CROSS - People felt that the king runs were strong for a long time but weak the last few years. A couple of participants pointed to the late 1930s and 1940s as strong salmon years, particularly for the kings. This continued into the 1950s and again in the 1980s. But they remember 1997 as a disaster year yet they still got what they needed. 1999 was a good year and 2000 was a weak year. 2001 was better and 2002 was even better.

NULATO - Participants remember 1993-1994 as good years and 2000-2001 as ‘not that thick.’ In the 1960s, people spoke of a year with very little salmon.

“I remember there was one year there was no fish, we had to kill our dogs.” (N-3)

One participant said that there were less fish in the past than now. He says that there were not many kings in the past but just enough for their use.

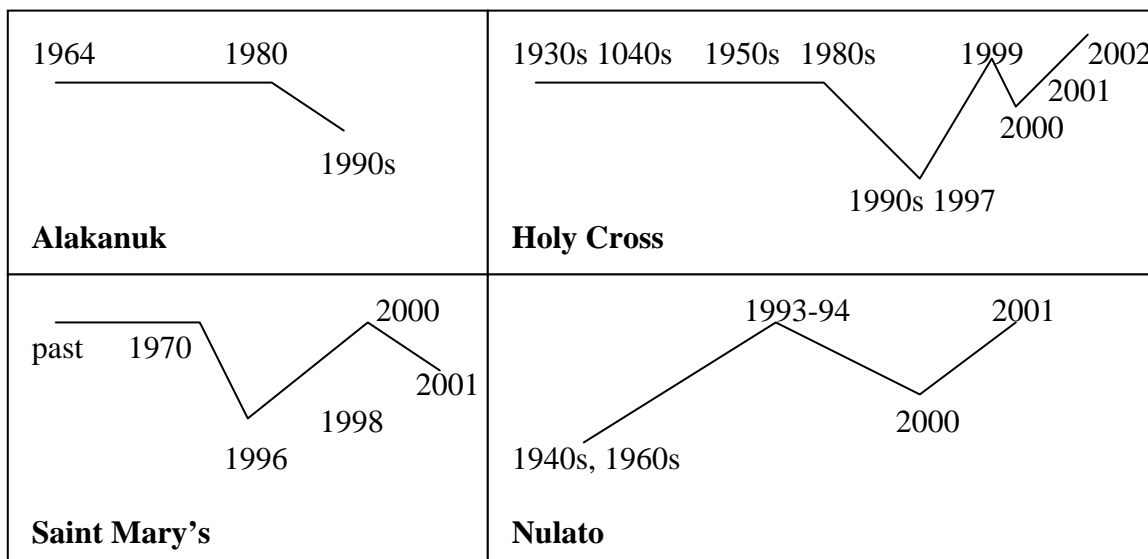


Figure 6. Qualitative Observations of Run Strength

In commenting on times of shortage, elders in Saint Mary's say 'they come in abundance before they disappear.' In Holy Cross, participants had never heard of a salmon shortage in their lives except the last few years. They said that as far as they could remember there were a lot of salmon and that there's never been a time of no salmon. Holy Cross participants indicated that you could always get what you needed for subsistence but the salmon runs started to decline in the 1950s. In Nulato, one participant spoke of a year in the 1960s which had no salmon. But s/he also said that there had never been a time of not enough salmon. A participant in Nulato claimed that

the False Pass fishery had a negative affect on the number of salmon. This was proven to him/her one year that it was closed and the number of salmon in his/her area was higher. Another person in Nulato commented that there were several times in the past, around 1940, that salmon runs were so low s/he had to get rid of their dogs. Another person said that the amount of salmon you catch is directly related to being in the right spot at the right time. S/he said that some years it is good and some years, things are poor. S/he went on to say that sometimes the salmon are not as thick but they always show up. In addition, s/he believes every other year or every third or fourth year is a good year for salmon.

Traditional Indicators of Run Strength

In Alakanuk one participant claimed that if there many salmon at first then less salmon would follow in later pulses. Vise versa, s/he also said that if there were less salmon at first then more will follow in later pulses. In Saint Mary's people looked to the eel run (lampreys), saying that if the eel run is heavy then the king salmon will run heavy. On the other hand, if the eel run is light then there will be few salmon. These indicators were learned from their elders. Another indicator that participants in Saint Mary's follow is observations of moon and the wind. One participant has learned that if the moon is curved like a bowl then there will be more salmon but if it is curved down then there will be less salmon. And finally in Nulato a participant told us that a red sky at night means the kings will be strong the next day. In terms of timing of heavy run within seasons in Nulato, people said that the kings always run heaviest just before the 4th of July.

Reasons for Less Salmon Today

When asked why there might be less salmon today, participants in Alakanuk had a long and varied list of reasons. These included an increase in the number of people fishing, more efficient fishing, commercial fishing, mining in the spawning areas and pollution. Almost everyone in Alakanuk referred to the commercial season, processors, farmed salmon, roe stripping, ocean fishing or some other kind of commercial influence on the fishery. They were particularly concerned with changing times and a waste of fish in the ocean and the roe fishery interfering with spawning. They also spoke of wind and weather having an effect on the number of fish that arrive, the participants noted that

“When winter winds are mild, there are less fish” (A-2).

In the other communities people were concerned about commercial fishing because they saw its affect on the size of the king salmon reaching their community. Upriver people were concerned about the egg takes and its effect on spawning. Participants told us that ocean conditions and food availability for the king salmon while at sea affects their return. Cold winters were also considered by some to be a contributor to a low salmon run.

Throughout the study area, people were concerned about an increase of pollution and sewage getting into the Yukon River and trash in the river. They were particularly concerned when this occurred in the spawning areas. They were also concerned about the affect of modern equipment, faster boats, and anchors on both the salmon and the habitat. Participants were concerned about the affect of the noise on the salmon, fearing that it causes shock.

Many people commented that the decline of salmon is due in part to people fighting over this resource. According to their traditions, talking too much about or fighting over a resource through regulations and other attempts to control an animal population causes them to hide or disappear (Fienup-Riordan 1994). Others said that

“Our elders tell us that they come in abundance before they disappear. The knowledge learned from my father is that when animals or fish are too highly talked about or limited by man, they are lost to humans. (SM-6)

A comment made over and over was, *‘they have their own cycle.’* It is believed that the king salmon come in cycles ranging from 1-4 years to a much longer period of time. Many people throughout our study attributed the smaller runs of king salmon to a low point in the cycle.

Fish Positioning

Perhaps not surprisingly, information on where salmon position themselves in the river changed as we moved upriver. In most of the villages, people noted that the king salmon like eddies and use them to rest as they make their way upriver. Some even noted that king salmon may stay in these eddies for up to 24 hours. People were also keenly aware of the way the river changes channels and how sandbars and eddies sometimes change every year. The salmon, in response, change their route annually to accommodate changes in the river.

ALAKANUK - One participant noted that the king salmon swim higher in the water when the water is rougher, perhaps surfing with the waves for momentum. In turn, they go deep when the water is calm. Others in Alakanuk agreed with these comments. There are tidal effects in

Alakanuk, in contrast to the other villages upriver. People here noticed the tidal affects on the king salmon, and told us that when the tide comes up the salmon follow the tide, taking shortcuts over the sandbars. When there is a strong tide, the kings may move to the center of the river where it is calmer.

Up and down the river we heard how the wind affects where salmon travel. Salmon seem to prefer the windy side of the river and this affects where salmon get caught. People said that if there is a south wind, the salmon would go to the north side and if a north wind, the salmon would go to the south side of the river. If the wind was calm, the salmon would stay in the main channels. Many people in these four communities commented that when the water is high, the salmon spread out and when it is low, they congregate in the channels. They also avoid debris or trash. Where they position themselves is related to water levels and location of sandbars.

SAINT MARY'S - When the water is very choppy the salmon tend to swim on the slack side of the river. Water temperature was also discussed as a factor affecting where salmon travel. A participant told us that the salmon like it cold and go to the cool bottom of the river when the water is warm. People commented on the effect of boat motors. They found that salmon would avoid the noise and speedboats, going deeper into the water when a lot of boats were around, as if the motors pushed the salmon down. One participant informed us that the salmon swim shallow when there is a stronger current. Another said that they like to swim in the current, between their rests in eddies.

HOLY CROSS - The kings go further out from the bank when the weather is hot. Another participant in said some salmon swim deeper because they like cold water.

The three upriver communities noted the sides of the river the king salmon chose to swim. In Saint Mary's people talked about north side salmon and south side salmon. These two types of king salmon are different colors, which people believe reflects where the salmon will spawn. People explained that the salmon that spawn in the Andreafsky River and other spawning streams nearby Saint Mary's swim on the north side, while on the south side of the river, the spawning kings swim much further upriver. In Holy Cross, one participant said that the king salmon mostly swim on the north side of the river; another said that the kings swim out from the bank while the dog salmon (chum) swim near the shore. Others said that they follow the cut bank. In Nulato, they also see the salmon sticking to the cut bank side of the river.

In both Holy Cross and Nulato, participants noted that the first run of king salmon sticks to the main channel, passing them by. One participant said the salmon follow the route of salmon from previous years.

“This river has been here for millions of years, the fish have had training for a long time, they know where the previous fish went so they go the same side” (HC-4).

The first run of king salmon stays in the middle to avoid the ice. This salmon run goes all the way to Rampart and people can be catching king salmon in Ruby or Galena before they start catching salmon in Nulato. Participants claimed that the Nulato run stops in eddies and rests along the way.

One participant in Nulato noted that kings tend to stick to the south side of the bank. In this area, the kings will swim on one side of the river and the chums swim on the other. The kings are mostly found on the side of the river opposite from Nulato. Participants told us that the king salmon stay out in the deeper water where it is slacker. These salmon follow the deep water and stay on the bottom of the river where there is no current. One participant said that sometimes the salmon stocks are mixed; when this happens, people can catch kings on the Nulato side near the bluff.

Different Stocks of King Salmon

ALAKANUK - People identified three runs of king salmon. The first is a robust and silvery run that is headed to Canada; this run is the fattest. One person explained that this run sometimes goes under the ice while the ice is breaking up and going out. But s/he also went on to say that winters are now milder, breakups are earlier and it may be different now than when s/he fished in the past. The second run is the “white noses”. They are considered the main run and go to Canada as well as rivers such as the Tanana and the Porcupine Rivers. They are more water marked and slimmer or leaner, and they hit the Alakanuk area between June 20th and June 27 and run for three days. The third run or last run spawns more locally in rivers such as the Andreafsky River. These fish are the leanest.

Order	Description	Name	Spawning location	Comments
1st	Robust, silvery, fattest	-	-	-
2nd	Water-marked, leaner	White noses	Canada, Tanana	Main run
3rd	Leanest	-	Andreafsky River	-

Table 3. King Salmon Stocks-Alakanuk

- No answer given to this question / category when asked

Participants mentioned a few indicators specific to king salmon runs that tell run strength. One example of this is when the adipose fin is closer to the tail of the salmon, it is seen as an indication that the heavy run of fish will come later. When the fin is further forward, the heavy run of kings will come early.

SAINT MARY'S - Participants also identified three runs of king salmon, although one participant indicated that s/he identifies four distinct runs of king salmon. Participants say there are the “king salmon” that come first, arriving early and possibly swimming under the ice as it is breaking up. Participants believe these first fish are headed to Canada to spawn. People described the second run as having darker snouts, leading some to call them “black noses”. The third run, which many people called the last run, is the “white noses”. These salmon are described as big kings with less oil, thus they dry faster. One participant describes a fourth run as little feisty kings, full of fight. S/he says these salmon are four, five and six year olds. In 2002, people described all the king salmon in general as dark blue, slim and long.

Order	Description	Name	Spawning Location	Comments
1st	-	King Salmon	Canada	Might swim under ice
2nd	Dark snouts	Black noses	-	-
3rd	Big kings with less oil	White noses	-	-

Table 4. King Salmon Stocks-Saint Mary's

- No answer given to this question / category when asked

HOLY CROSS - A few people described a first run of salmon that they often miss as the kings come upriver when there is still ice breaking up. They go past Holy Cross and are caught by people in upriver villages. One person described them as ‘super fish’ that follow the channel so nobody can catch them. Reportedly, these first kings are “pretty good-sized fish”. The participants in this area were split on the order of the next two runs of kings. Two participants felt that the next run is the “white noses”, two felt that the second run are “blue backs” and one said he could not tell the difference. Those that think the “white noses” are the last run described the “blue backs” as dark blue with big wide stomachs. These participants said the “blue backs” are the best kings, having solid, firm meat. Participants said that once the white noses arrive, they know the run is just about over as these salmon only run for about two or three days. Finally, one participant told us of a fourth run that has only been coming through Holy Cross for the last three years. S/he described these fish as white meat fish that belong on the coast. Their meat is more compact than the other king salmon.

Order	Description	Name	Spawning Location	Comments
1st	Pretty good sized	'Super fish'	-	Swims under ice, people in Holy Cross don't catch them
2nd or 3rd	-	White noses	-	-
3rd or 2nd	Dark blue with big wide stomachs, solid meat	Blue backs	-	Best kings

Table 5. King Salmon Stocks-Holy Cross

- No answer given to this question / category when asked

NULATO - Participants spoke of two runs of king salmon. They told us that the first run of king salmon is the 'better' fish. They are shinier and their meat is solid when it is cut. These fish are headed to Canada. Some participants described this first run as really dark and big fish. Some people thought that this run swims past Nulato. The second run is redder and spawns on the Alaska side of the border. They arrive in mid-July and may go to places like the Nulato River. This second run has softer meat. Some described this second run as grey fish, not as big as the first run but still good salmon. One person clearly stated that there is no third run in Nulato of king salmon.

Order	Description	Name	Spawning Location	Comments
1st	Shinier, solid meat, dark, big fish	?	?	Better fish
2nd	Redder, grey fish, softer meat	?	?	

Table 6. King Salmon Stocks-Nulato

- No answer given to this question / category when asked

At least two of the participants described a fall run of fish that causes some confusion with king salmon by its local name. Locally this fall run of fish are called "chinook" but they are not king salmon. These "chinook" arrive in the fall after the silver salmon. One of the participants described the difference in appearance between the fall "chinook" and the spring king salmon. S/he described the "chinook" as not having the spots on their sides that king salmon have. Both participants indicated that they don't eat these fish, one person saying that they have a funny taste like iodine, but that some people do like the taste. One of the participants described these fall "chinook" as having a shape like a humpy. S/he reported that when taken, the "chinook" is not cut like people in the area cut eating fish and that when people do take this fish; they only need a few to be satisfied.

"After all the fish go by, there's another run that we call chinook. They have a shape like humpy's. People don't even cut them like we cut eating fish. They cut it in a different way. They only get a few, like 10 and they are satisfied" (N-3).

Disease

ALAKANUK - People spoke of finding salmon with sores on their bodies, particularly in recent years. Some said that they only saw healthy salmon in the early parts of their lives. Others said that they still had never seen a diseased king salmon. One participant said that s/he has always seen a small number of kings with white spots that s/he would use for dog food, but since s/he does not cut fish anymore s/he could not comment on the frequency today. Another person told us that the shape of the kings in 1999-2000 was different than other periods. During this period the kings were smaller in size with larger heads and smaller bodies, slimmer and torpedo shaped. These fish were not robust and silvery. Reportedly, they were not malformed just slimmer and they had more *Ichthyophonus*.

SAINT MARY'S - Participants indicated that when they were young the king salmon were always healthy and that now was the first time they had seen unhealthy salmon. These people also had not heard their parents speak of unhealthy salmon. Some participants told us that the sick salmon are recent, within the last few years only. Others said that they have seen salmon with pus and other signs of disease a long time ago. They described the symptoms as pus on the inside of the salmon, pus marks on the meat or white marks on the meat. One participant said that in the year 2000 there was a lot of pus or worms in the meat of the king salmon. The salmon looked nice on the outside but the insides were full of pus. Others described the sick salmon as having spots on their meat inside the skin. The spots looked like pus but were white and milky, although sometimes it was hard and yellowish or greenish white. Sometimes the liver is stuck to the insides of the salmon which could be due to scar tissue left by parasites such as tapeworms (Joe Sullivan personal communication 2003). Some participants also said that there were salmon with fungus. During the 1999 and 2000 seasons, the participants stated that the salmon were dark in color and had less fat.

Many people said that the 2000 season's king salmon were not healthy, but they were slim, long and dark with blue scales. The year 2001 seemed to have fewer of these sick salmon and the salmon were fat. One participant said that in general some king salmon have soft flesh and some have firm flesh, once in a while s/he finds some with pus pockets. S/he saw 6 or 7 unhealthy salmon in the year 2001 and had seen some in the past. Two or three of his/her salmon had blood near the backbone between the layers of meat, which he had never seen before. S/he connected the unhealthy fish with the hatcheries.

HOLY CROSS - People said they started seeing diseased salmon in 1999. They found salmon with pus inside once they were opened. In 2000 people saw lots of wormy salmon with big sores, and the meat was pale. Participants believed that these may be hatchery salmon. Participants claimed that these salmon are different from wild Yukon River salmon and take longer to dry. The participants also stated that this type of salmon has been increasing over the last 10 years and that their parents didn't see this type of king salmon when they were younger. Others participants said that the year 2000 had a few diseased king salmon or salmon with spots. All the participants in Holy Cross agreed that the year 2001 had no diseased salmon.

NULATO - Participants concurred with comments from Holy Cross. Participants said they have only seen diseased salmon since 1995, only a few each year and none when they were kids. In 2001 they saw a few unhealthy salmon with white spots on their flesh or with white milky stuff in the meat or clear jelly in patches of the flesh. In 2000 the Nulato participants saw more sick salmon, which looked beautiful on the outside. Once the salmon were cut open there were white spots and a strange smell. Some people indicated that some of the salmon were full of these white spots.

King Salmon Size

In every community we visited people felt that the kings are, on average, the same size now as they were in the past. A few people felt that the king salmon are not the same size. One participant in Alakanuk said that the average sized king salmon caught when he was a kid was 30 pounds and now the average is 22 pounds. He said that years ago they were catching 7-10 year olds and now they are catching 5-6 year old kings. Another participant from Nulato also disagreed with the rest of the participants that the kings are the same size now. This person felt that the kings are bigger now than they were four years ago. Participants also felt that commercial fishing catches all the bigger salmon.

People had many other related comments, such as there are a lot of jack king salmon coming through their communities. Another said that it used to be that the first run was big kings and the second was smaller kings but this is no longer true, now the runs are mixed. One person pointed out that the net sizes have changed and this may affect the size of kings people catch. People also spoke of winds, in that different winds bring in different size salmon. This was brought up most frequently in Saint Mary's. Here people noticed that when there are north winds in the winter, they

see smaller king salmon, when there are south winds they see bigger king salmon. A piece of wisdom passed down by the elders was that when the mosquitoes are small then the salmon are small. Another piece of wisdom from the elders is that the salmon come in cycles. They get bigger and smaller over time. Old timers have said that if small salmon come first, then you will have a good long run. And finally, a couple of people noted that when they were children, all the salmon looked big.

Knowledge of Spawning Locations

ALAKANUK - People indicated that no spawning took place in the near vicinity of their community and that the salmon had to reach at least as far as the gravel beds of the Saint Mary's area. Many said the salmon go 'all the way up river.' One person described the spawning habits of the king salmon by run, explaining that the first run goes to Canada, as does the second run but the second run also goes to the Porcupine River, the Tanana River and other spawning streams. The third run spawns in the closer spawning streams such as the Andreafsky River, and the Atchuelinguk River. S/he went on to say that king salmon that spawn in a stream that enters the Yukon River from the south mouth swim near the south bank and salmon heading to a stream north of the Yukon River swim on the north side. S/he indicated, as did others, that the kings need special gravel beds to spawn in. Other participants agreed that some of the king salmon are headed to the streams below Mountain Village; the Andreafsky and the Atchuelinguk Rivers.

SAINT MARY'S - People were aware of the importance of the Andreafsky and Anvik Rivers as spawning grounds. They stated that salmon that are red when they pass by Saint Mary's are spawning in these nearby streams and but that the first run of kings are headed further towards Canada. A couple of people commented that salmon head to the same spawning areas every year. They also believed that salmon swim on the side of the river that they will turn off to spawn.

HOLY CROSS - The "torpedo shaped salmon" were said to head to the Anvik River, while "white noses" would go elsewhere like the Shageluk River. One person claimed that s/he could tell by the size of the eggs where the salmon are heading. Smaller eggs in salmon indicate that they have a longer ways to travel before spawning. Closer spawning salmon have larger eggs and bigger bunches of eggs. People also mentioned kings spawning in the Koyukuk, Anvik, and Innoko Rivers as well as Canada, the Porcupine, the Tanana, the Andreafsky and Atchuelinguk Rivers.

NULATO - The Nulato River and Ninemile Creek were added to the list of known spawning creeks. People in Nulato knew that many of king salmon currently go up the Koyukuk River; people also stated that salmon go back to where they were born. People said the salmon take a lot of different side creeks and that not all salmon make it as far as Nulato. In this community, at least one person said that each run does not go to a specific location.

DISCUSSION

The twenty-nine participants interviewed for this project offered extensive information about king salmon populations and behavior. The participants, ranging in age from 40 to 80, were a mixture of elders and active fishers who obtained their information through oral traditions, their own personal experiences, observations and analyses made over their lifetimes as well as influences from western science and the media. As each person has a different set of influences and experiences, information varied with each participant, yet there was also considerable overlap of information. The range of information collected was often due to each participant's various geographic location, history and personal experiences and interpretations of individual events.

As noted in much of the information collected in this study, people have tremendous affects on the salmon runs and harvest levels of the Yukon River. Participants were extremely vocal about the effects of fishing regulations on their lifestyles. The recently regulated subsistence openings, closings and agency management of the fishing season troubled many. A study like this has the potential to lessen the gap between regulators, managers and fishers by articulating more about the needs of the local fishers, sharing this kind of information and creating forums for people to speak.

Repeatedly, we heard about the value of the intimate knowledge gained through generations of year-round observations in a localized area. This detailed knowledge helps the fishers know where to look for the king salmon. They are keenly aware of the way the river changes and how the salmon in response change their route annually to accommodating these changes. They know that the wind affects where the salmon travel, preferring the windy side of the river. They believe that the salmon are sensitive to boat motors, going deeper to avoid the noise. The three upriver communities note that the king salmon swim on the side of the river where they will exit to spawn

This study occurred during a time of declining salmon runs. Much of the information collected reflects these times. Participants seemed to report run levels only on the most recent years or the most distant years. Participants felt that the reduced salmon runs were caused by a variety of

influences such as increased pollution, ocean conditions and people fighting over the resource. Many voiced their belief that king salmon, like other species, have a cycle of high and low numbers. When asked about disease occurring in the king salmon, participants reported that they had only heard of diseased salmon recently. Many commented on the ‘torpedo shape salmon’ they were seeing most recently. Throughout the study area, people felt that the chinook are the same or similar in size now as they were in the past but they expressed some concern over the mixing of runs they see now. They explained to us that the runs used to come one at a time, kings then chums, and now they are often mixed swimming upstream in the river. The goal of this study was not to gather substantive information on run strength or growth over time but rather to gather qualitative local insight gained through generations of observations.

Reduced king salmon runs require restricted harvest levels that greatly affect the economic prosperity and nutritional levels of local people included in this study. Commercial fishing income provides cash supplements needed to support the subsistence harvest. In the upper river, we noted a change in distance traveled for subsistence harvesting, a less frequent return to the main village or less frequent travel to fish camp and fishing at the village. This was often a way to save essential cash otherwise spent on boat gas. Overall, the participants told us that people are spending less time at fish camp today than they did in the past. They attributed this to a variety of reasons including preferences for modern conveniences not available at fish camp and the inconvenience of the changing fishing schedules.

The arrival times of the salmon throughout the study area were most often attributed to the timing of breakup and the influence of the weather. Winds are an important element of the weather affecting the salmon, particularly near the mouth of the river. Participants explained that stronger winds produce greater numbers of salmon and that the wind direction and the tides affect which mouth the salmon enter. People still rely on inter-village communication, as they did in the past, although this is assisted by modern methods of communication such as CB radio, the telephone or YRDFA teleconferences.

One issue that had a variety of opinions was whether or not king salmon swim upriver before the ice clears or the ‘ice king salmon’. This seems to be of great interest because many of the king salmon may not be counted in the run abundance and escapement calculations. Whether the king salmon swim under the ice or not is still debated, participants say, because of the difficulty of getting out on the river during break-up. This is an area that could benefit from further research.

The study participants' estimation of king salmon arrival time coincides closely with the estimates provided to YRDFA by the ADFG although there was much variation in the participants' estimates. As one participant pointed out, the salmon arrival time is always changing. Some of the things that they believe affects the arrival time of the king salmon include the size of the run, the temperature of the water and the current.

A goal of this study was to look at ways that TEK could be used in the fishery management. At a recent workshop on TEK and salmon research, restoration, and management held in Anchorage in January 2003, a Yukon River fishery manager from ADFG commented that one of the most difficult management issues is predicting how many salmon will return each year. He said that it would be helpful to have a run projection informed by TEK, and that they would include these projections in the pre-season management plan, along with ADF&G projections (TEK forum 2003). Participants in this study discussed a variety of TEK indicators describing salmon arrival time, run strength and size. Arrival time of the king salmon is associated with the arrival of geese, the fish birds (dark, little birds) and blue bell flowers. Run strength is related to the run strength of the eels, the shape of the moon and a red sky the previous evening. Winds in the villages near the mouth are said to affect the amount of salmon and the month in which they enter the river. Some participants can tell where the salmon are head for spawning by the size of their eggs. Finally, the size of the salmon was said to be like the mosquitoes, when the mosquitoes are small, the salmon are small. Compiling these observations into a TEK run projection annually could be beneficial to managers prior to the season opening.

Finally, we learned of different stocks of king salmon identified locally along the river. In the lower three communities they saw three to four different runs or pulses of king salmon, while Nulato saw only two. One could surmise that the third run has exited the mainstem and turned into the tributaries by the time the salmon reach Nulato. These chinook have a variety of names, including 'white noses', 'blue backs' and 'black noses', and are judged by their appearance and quality of meat. A study is underway (FIS-03-015) currently comparing the phenotype and genotype of these Yukon River king salmon to learn if they are of different genetic stock which could provide an additional tool for managers. This study could prove to be a useful melding of TEK and western science.

CONCLUSION

Participants in this study highlighted the affect that the subsistence schedule has on their lifestyle. They also pointed out that their detailed knowledge, gained through generations of observations of their local environment, tunes them in to king salmon behavior. They believe that the changing salmon patterns can be at least partly attributed to a natural cycle of high and low numbers. Diseased salmon have been observed only within recent years by our participants. They also believe that the king salmon are the same size now as in the past but the stocks are more mixed than in previous years. Reportedly, people are spending less time at fish camps but still relying on a variety of forms of inter-village communication for updates on salmon arrival.

Areas for future research would include clarifying if king salmon swim upriver under the ice. This information is important as many king salmon may not be counted in the run abundance and escapement calculations. Participants provided a variety of examples of TEK indicators describing salmon arrival time, run strength and size. Compiling TEK run projections annually could assist managers in predicting how many salmon will return each year. Finally, further research is being conducted on the different stocks of king salmon identified locally through FIS-03-015 Phenotypic Characteristics of Chinook Salmon in the Subsistence Harvest.

In general, additional TEK studies should be carried out on the Yukon River. Utilizing local people and local knowledge in fisheries management will enhance the process of management. Local people are able and interested to join in test fishery projects and they should be looked to as an additional resource that can compliment western fishery management. Community based research designs that utilize local knowledge will help people to feel appreciated for their knowledge and concerns. Utilization of TEK increases the level of mutual respect and understanding between local residents and state and federal agencies. Additional projects can promote a bridge between TEK and stock status and trends. This practical bridging of knowledge can positively affect fisheries management to protect and preserve salmon species and the livelihood of subsistence and commercial fishing on the Yukon River.

Local people of the Yukon River need recognition that their traditional values and ways of thinking about the world are valid and important. The study of TEK validates the use of local knowledge. The solicitation of TEK from elders can motivate youth to learn more about their cultural heritage and create a link between the generations. This will empower local people to deal with ecological problems and create a more sustainable fishery for future generations.

LITERATURE CITED

(1988). Salmon Fishing Methods of the Yukon River. Juneau, Alaska Department of Fish and Game, Division of Subsistence.

(2000). Alaska Atlas & Gazetteer (Third Edition). Yarmouth, Maine, DeLorme.

(2002). Community Database Online, Alaska Department of Community and Economic Development. **2003**.

(2003). Workshop on Traditional Ecological Knowledge and Salmon Research, Restoration and Management. Anchorage.

Andersen, D. B., and Fleener, C. L. (2001). Whitefish and Beaver Ecology of the Yukon Flats, Alaska. Juneau, Alaska Department of Fish and Game.

Berger, T. R. (1985). Village Journey: The report of the Alaska Native Review Commission. New York, Hill and Wang.

Berkes, F. (1999). Sacred Ecology: Traditional Ecological Knowledge and Resource Management. Philadelphia, PA, Taylor & Francis.

Borba, B. M., and Hamner, H. H. (2001). Subsistence and Personal Use Salmon Harvest Estimates Yukon Area, 2000. Anchorage, Alaska Department of Fish and Game.

Clark, A. M. (1981). Koyukon. Handbook of North American Indians. Washington, Smithsonian Institute. **6**: 582-601.

Cruikshank, J. (1981). "Legend and Landscape: Convergence of Oral and Scientific Traditions in the Yukon Territory." Arctic Anthropology **18**(2): 67-93.

Fienup-Riordan, A. (1986). When Our Bad Season Comes: A Cultural Account of Subsistence Harvesting and Harvest Disruption on the Yukon Delta. Anchorage, Alaska Anthropological Association.

Fienup-Riordan, A. (1994). Eskimo Essays. New Brunswick, New Jersey, Rutgers University Press.

Fox, L. M. (2002). Collection of Traditional Ecological Knowledge (TEK) Regarding Subsistence Fisheries in the Eagle and Circle Areas of Interior Alaska. Eagle, USFWS Office of Subsistence Management.

Harrington, G. L. (1918). The Anvik-Andreafski Region Alaska. Washington, Government Printing Office.

Holder, R. R., and Senecal-Albrecht, D. (1998). Yukon River Comprehensive Salmon Plan for Alaska. Anchorage, Alaska Department of Fish and Game.

Huntington, H. P. (1997). "Observations on the Utility of the Semi-Directive Interview for Documenting Traditional Ecological Knowledge." Arctic **51**(3): 237-242.

Klein, J. C. (2001). Managing Differences: Values and Perspectives that Influence Utilization of Salmon Along the Yukon River. Brattleboro, VT, The School for International Training.

Krauss, M. E. (1984). Native Peoples and Languages of Alaska. Fairbanks, Alaska Native Language Center, University of Alaska.

de Laguna, F. (2000). Travels Among the Dena: Exploring Alaska's Yukon Valley. Seattle, University of Washington Press.

Merritt, M. F. (2002). Yukon River Joint Technical Committee Report: Plan for Research, Restoration and Stewardship of Salmon Stocks Originating in the Yukon River, 2002. Fairbanks, AK, Yukon River Joint Technical Committee.

Senecal-Albrecht, D. (2000). "King and chum salmon returns at record low levels." YRDFA News **7**(1).

Stephenson, N. J. (1979). The Ethnohistory of the Lower Yukon-Innoko Region with Emphasis on Local Waterways. Anchorage, Department of Natural Resources- Alaska.

Usher, P. J. (2000). "Traditional Ecological Knowledge in Environmental Assessment and Management." Arctic **53**(2): 183-193.

Vania, T., and Vince Golembeski, Bonnie M. Borba, Tracy L. Lingnau, John S. Hayes, Kevin R. Boeck, William H. Busher (2002). Annual Management Report Yukon and Northern Areas 2000. Anchorage, Alaska Department of Fish and Game.

Vanstone, J. W. (1979). "Ingalik Contact Ecology: An Ethnohistory of the Lower-Middle Yukon, 1790-1935." FIELDANA Anthropology **71**.

Williams, J. G. (2000). Alaska Population Overview: 1999 Estimates. Juneau, Alaska Department of Labor and Workforce Development, Research and Analysis Section.

Zagoskin, L. A. ([1847] 1967). Lieutenant Zagoskin's Travels in Russian America 1842-44. Toronto, University of Toronto Press.

APPENDIX A. Key Respondent Interview Guide

Question #1) Where do you fish for salmon and how long have you fished there?

Question #2) What kind of fishing gear do you use for salmon?

Question 3) When do the Kings usually arrive in your area?

Question #4) What kinds of things affect arrival time?

Question #5) Can you remember any years that they arrived especially late or especially early?

Question #6) Can you remember any years when the king run was especially strong or weak?

Question #7) How do the kings position themselves in the river?

Question #8) Are there different kinds or stocks of kings in this area?

Question #9 Can you remember seeing kings in the past that were not healthy?

Question #10) Do you think the kings are the same size now as they were in the past?

Question #11) Do you have any information about where king salmon spawn?

APPENDIX B. Consent Form

**Traditional Ecological Knowledge of Salmon on the Yukon River
Funded by the Federal Office of Subsistence Management**

Project carried out by the Yukon River Drainage Fisheries Association

Contact: Jill Klein
 725 Christensen Dr. #3-B
 Anchorage, AK 99501
 Toll-free telephone: 1-877-999-8566

Participant Consent:

I, _____, understand the purpose of the research project and am willing to take part in this project. The information that I provide will be recorded, written in notes and marked on maps. All such information, including direct quotes, may be used in the final reports and other research products of this project. The Yukon River Drainage Fisheries Association and Jill Klein will be responsible for writing a report based on this information. I understand that I will have the opportunity to review the information that is documented and that I have the right to correct and edit the draft report to ensure that it is accurate and that it is not harmful to me or my community.

In addition:

- | | | |
|--|-----|----|
| • Photos may be taken of me | yes | no |
| • My name may be used | yes | no |
| • I may be video and or voice recorded | yes | no |

Signed: _____ Date: _____

Address: _____

Phone
number: _____

APPENDIX C. Maps

Figure 1. Map of Yukon River Drainage

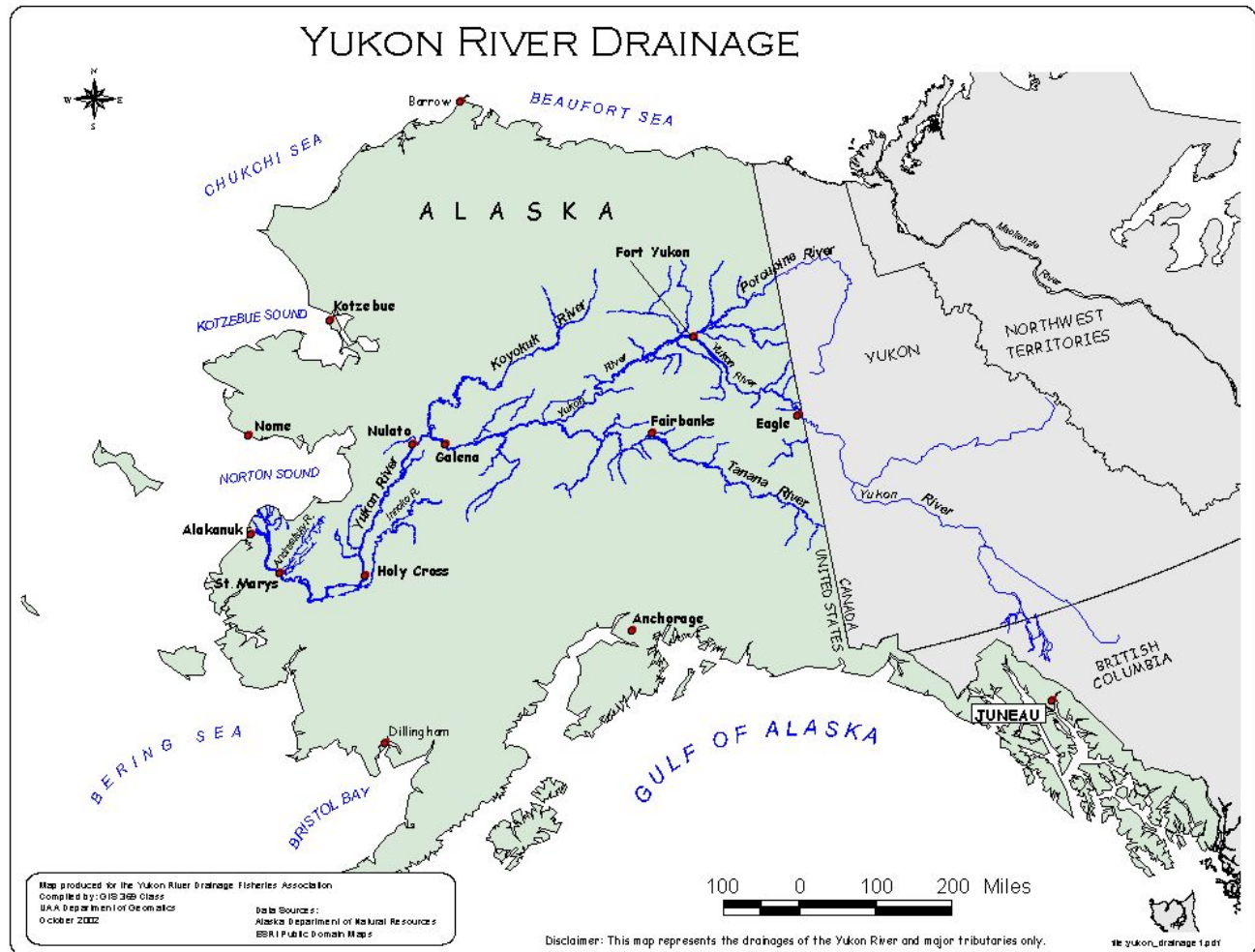


Figure 2. Map of the Study Area

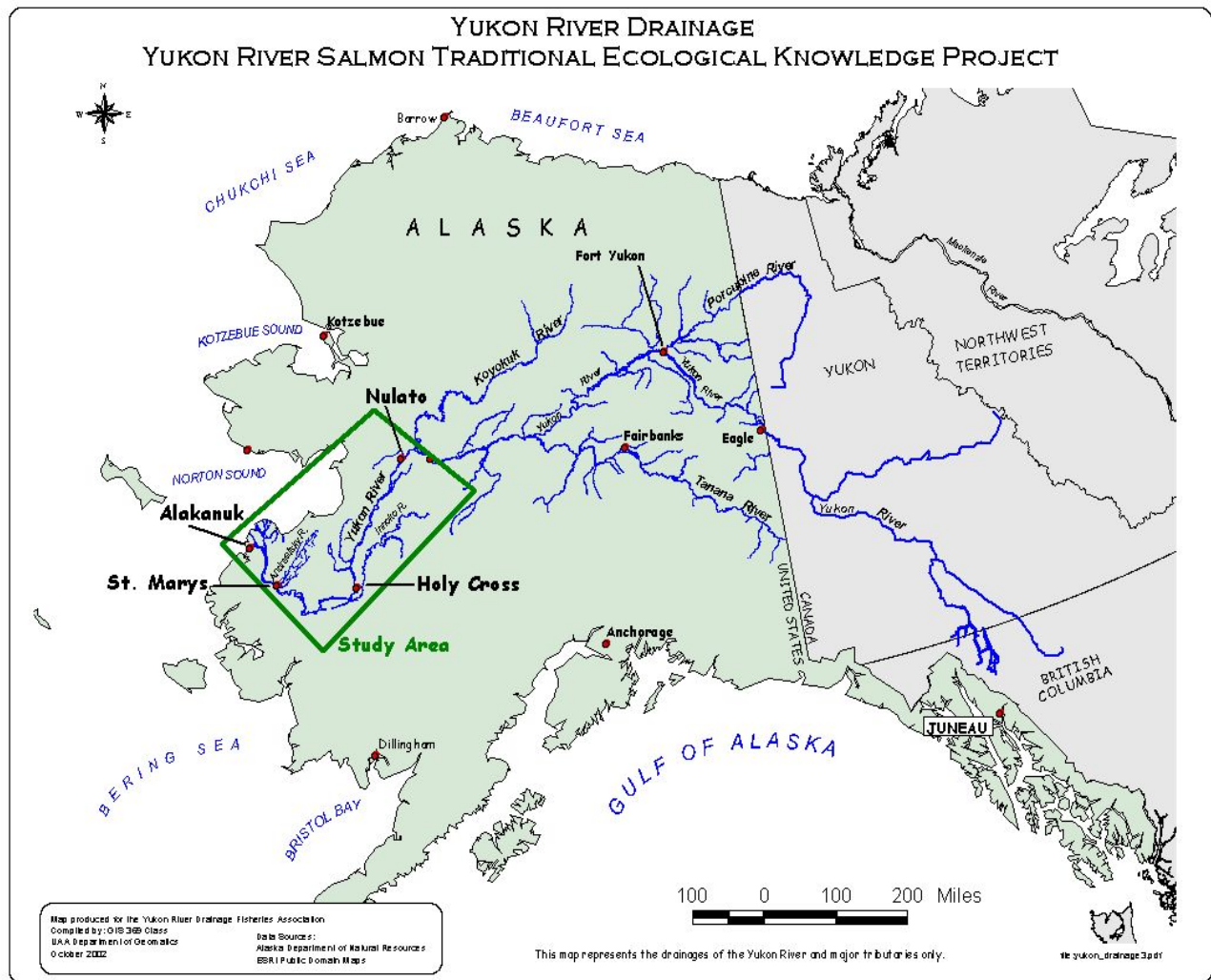


Figure 3. Map of Study Region detail

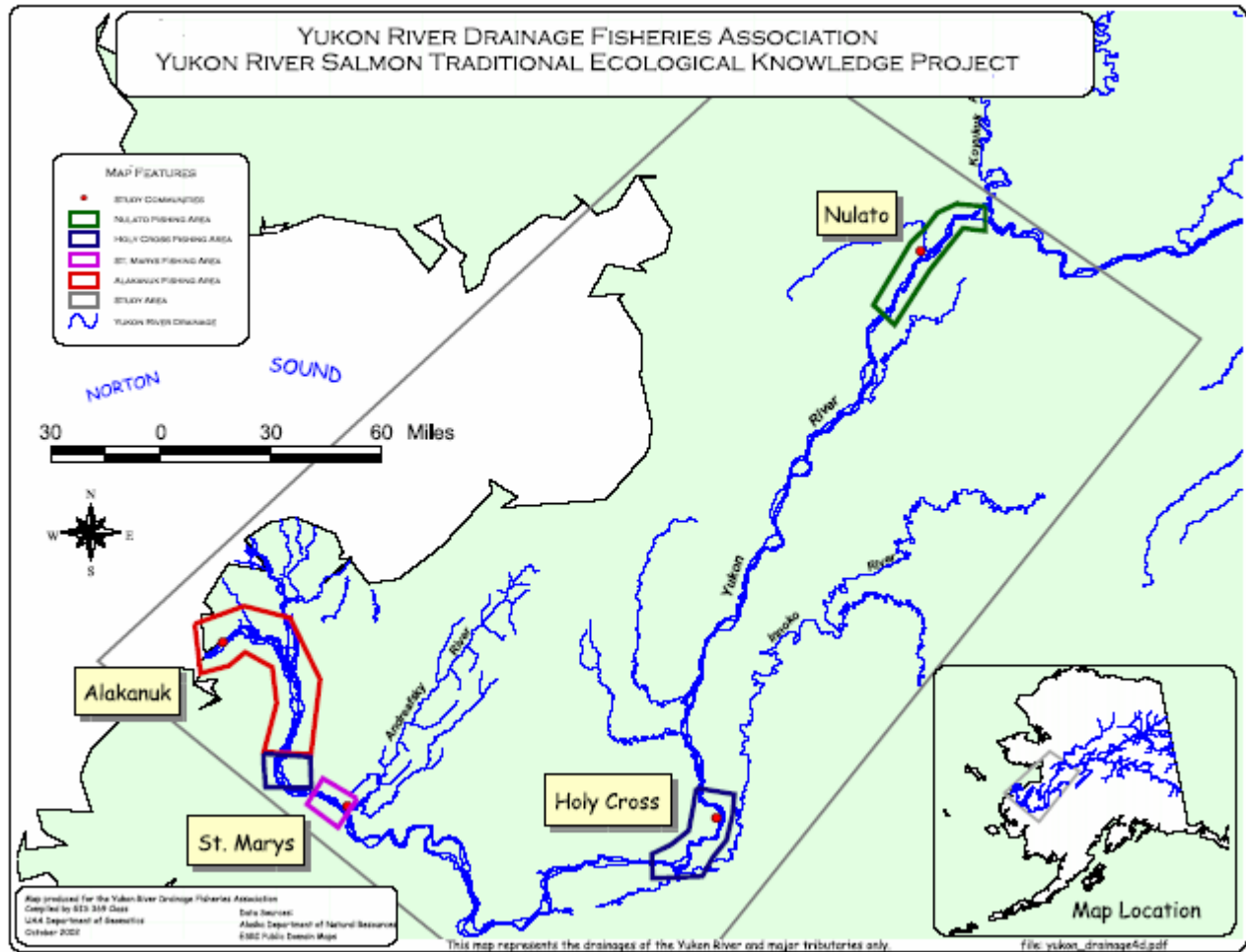


Figure 4. Map of Fishing Districts

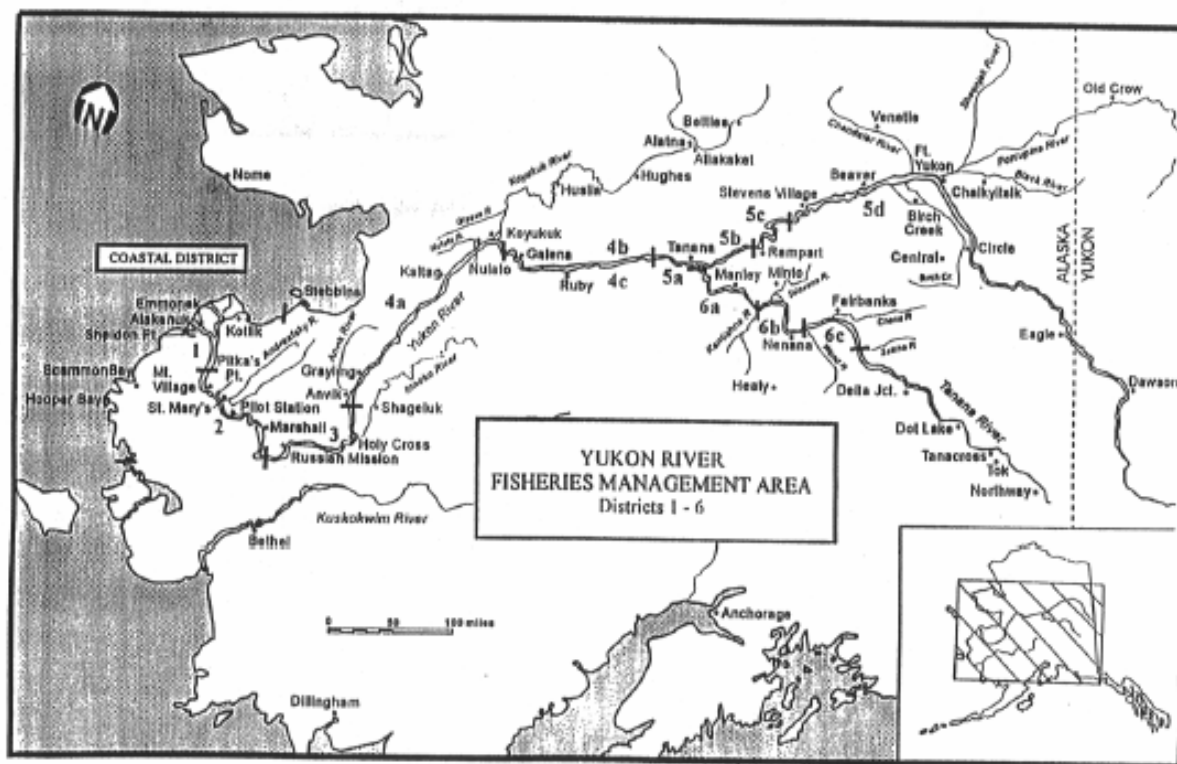


Figure 5. Map of Alakanuk Fishing Areas

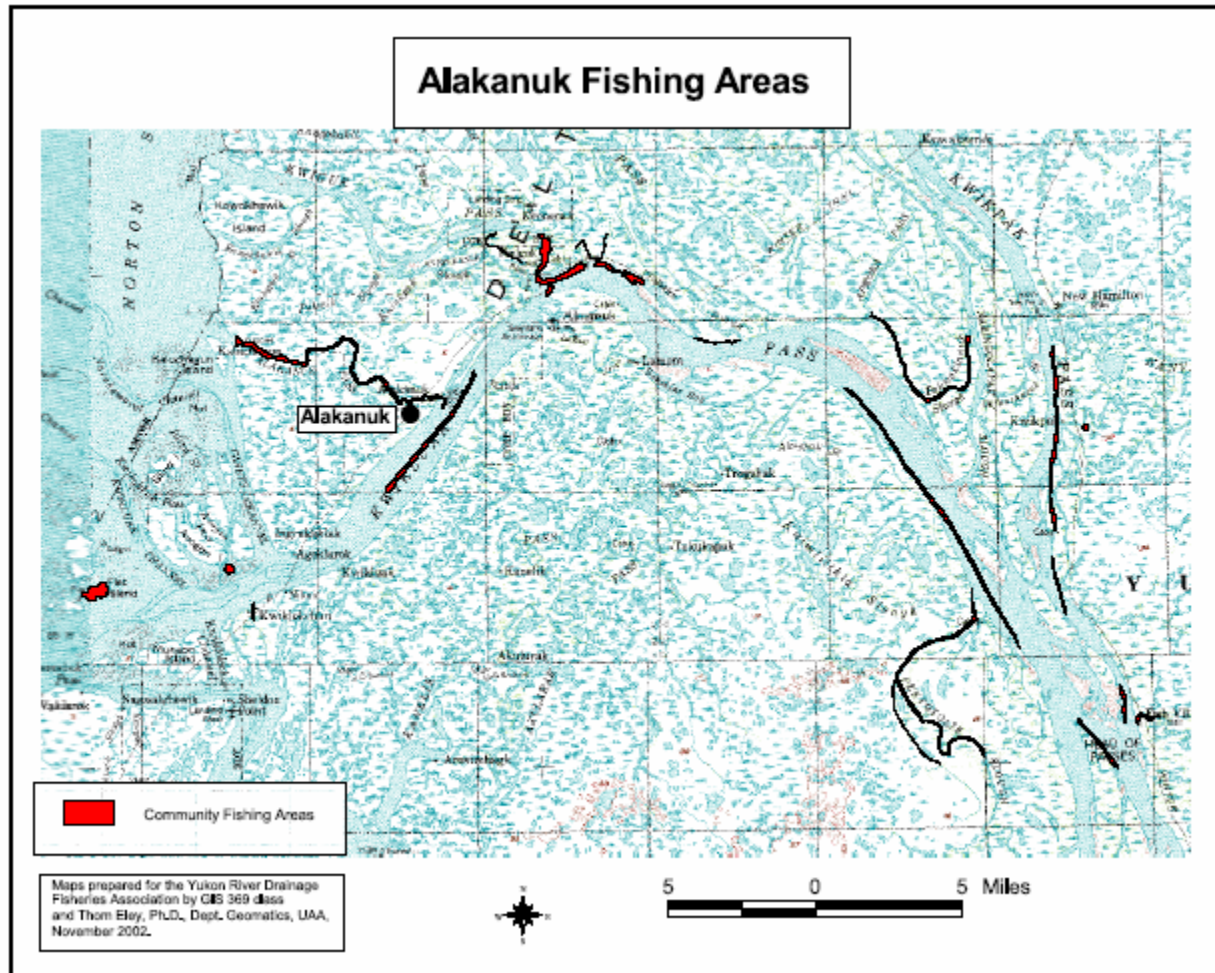


Figure 6. Map of St. Marys Fishing Areas

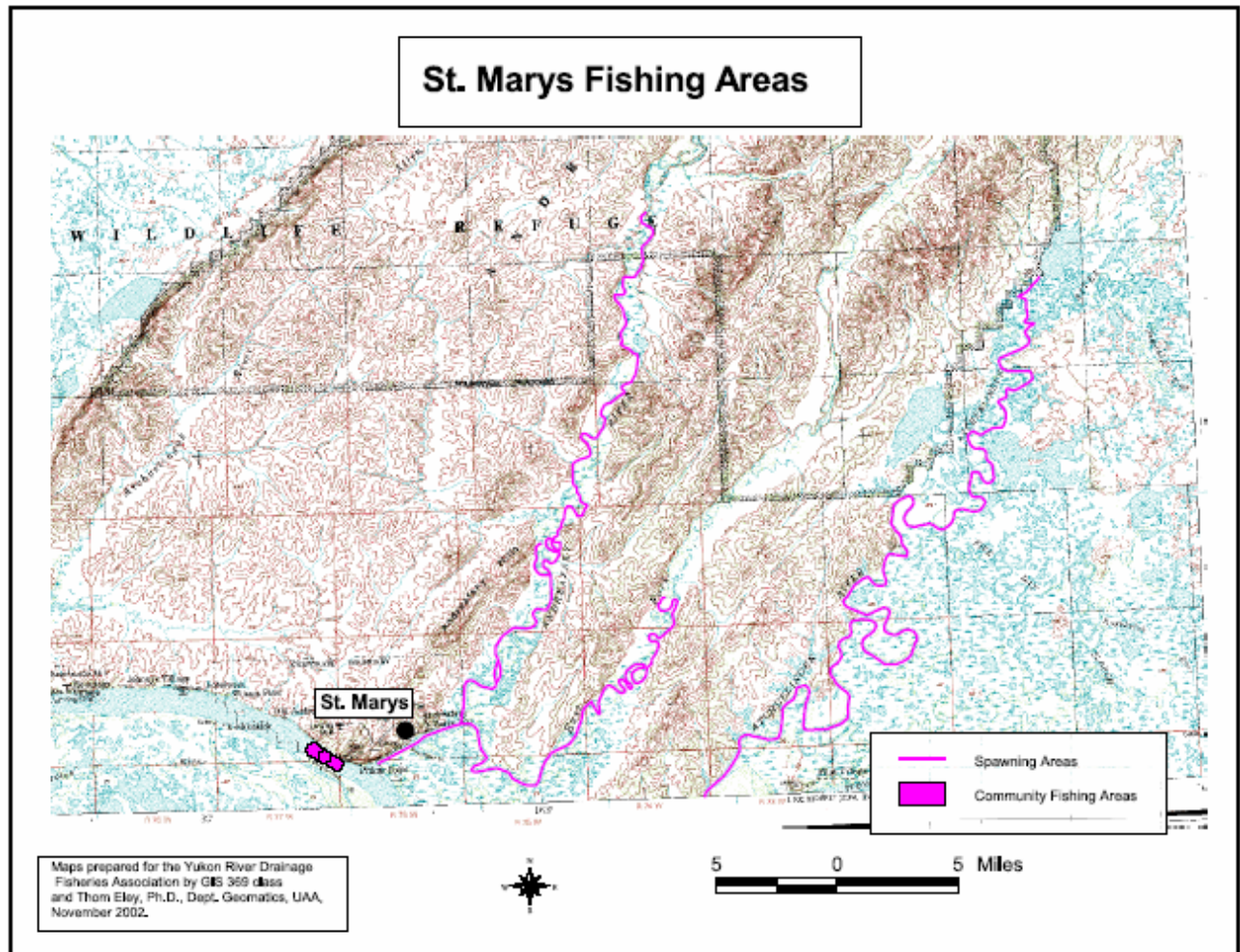


Figure 7. Map 1 of Holy Cross Fishing Areas

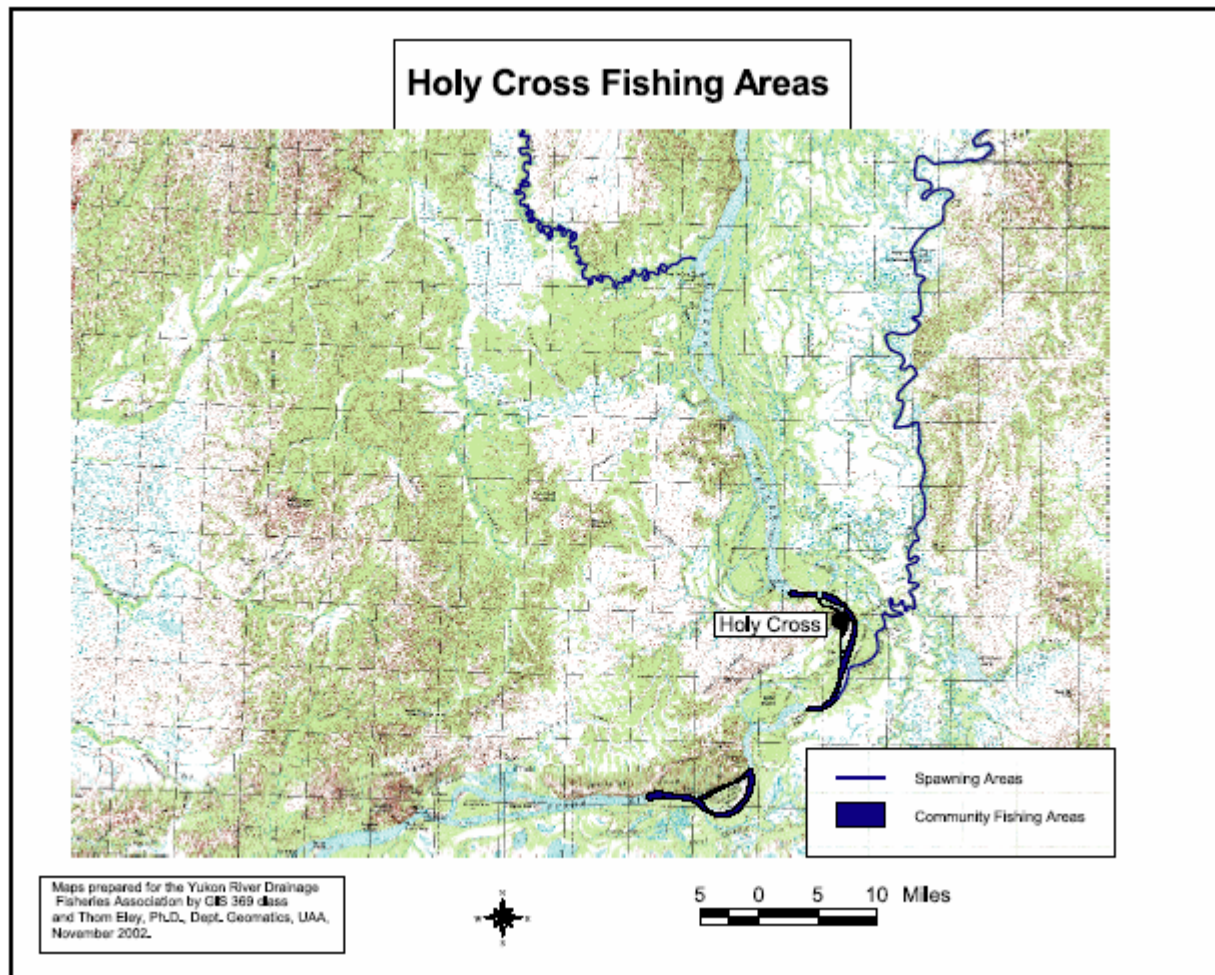


Figure 8. Map 2 of Holy Cross Fishing Areas

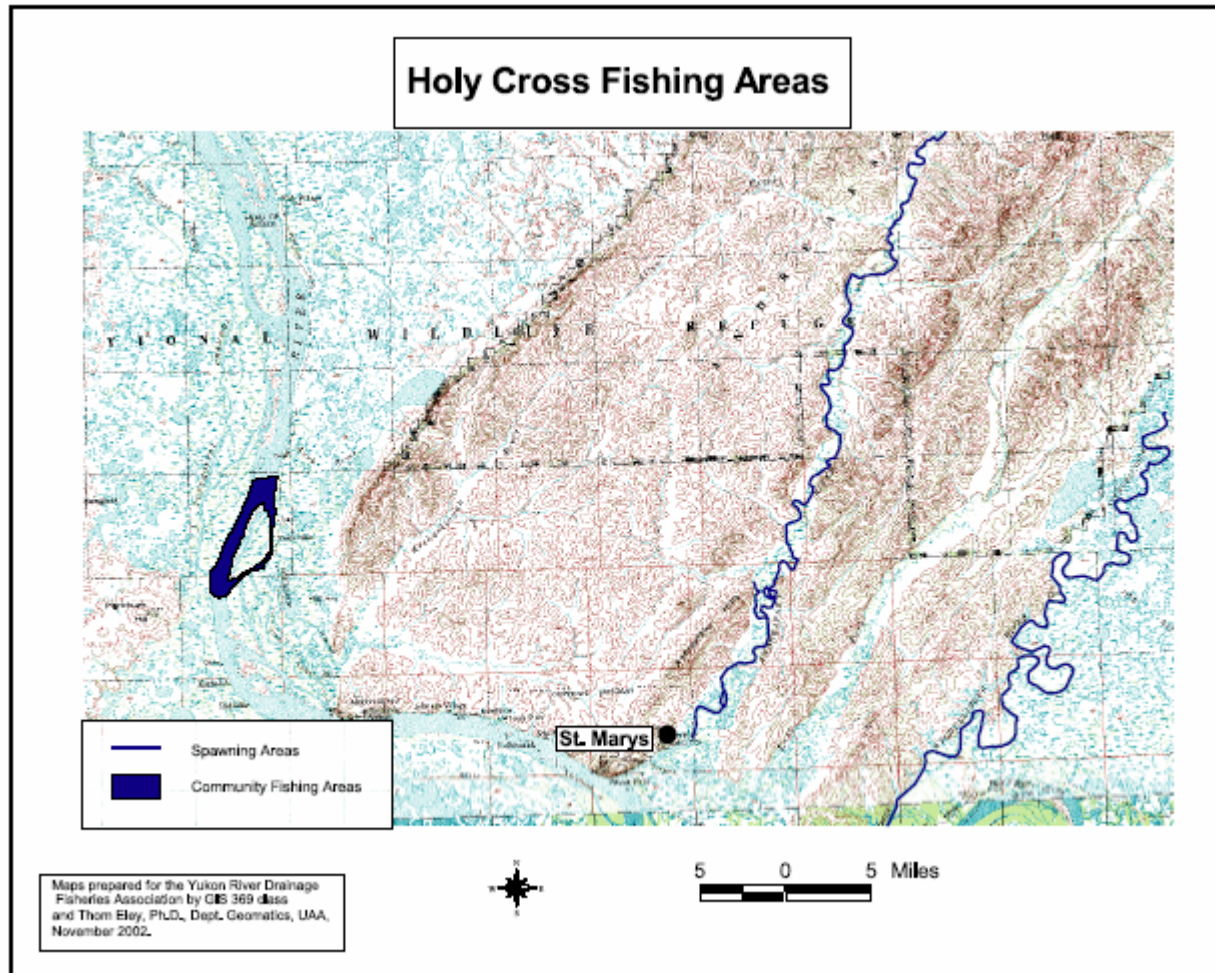


Figure 9. Map of Nulato Fishing Areas

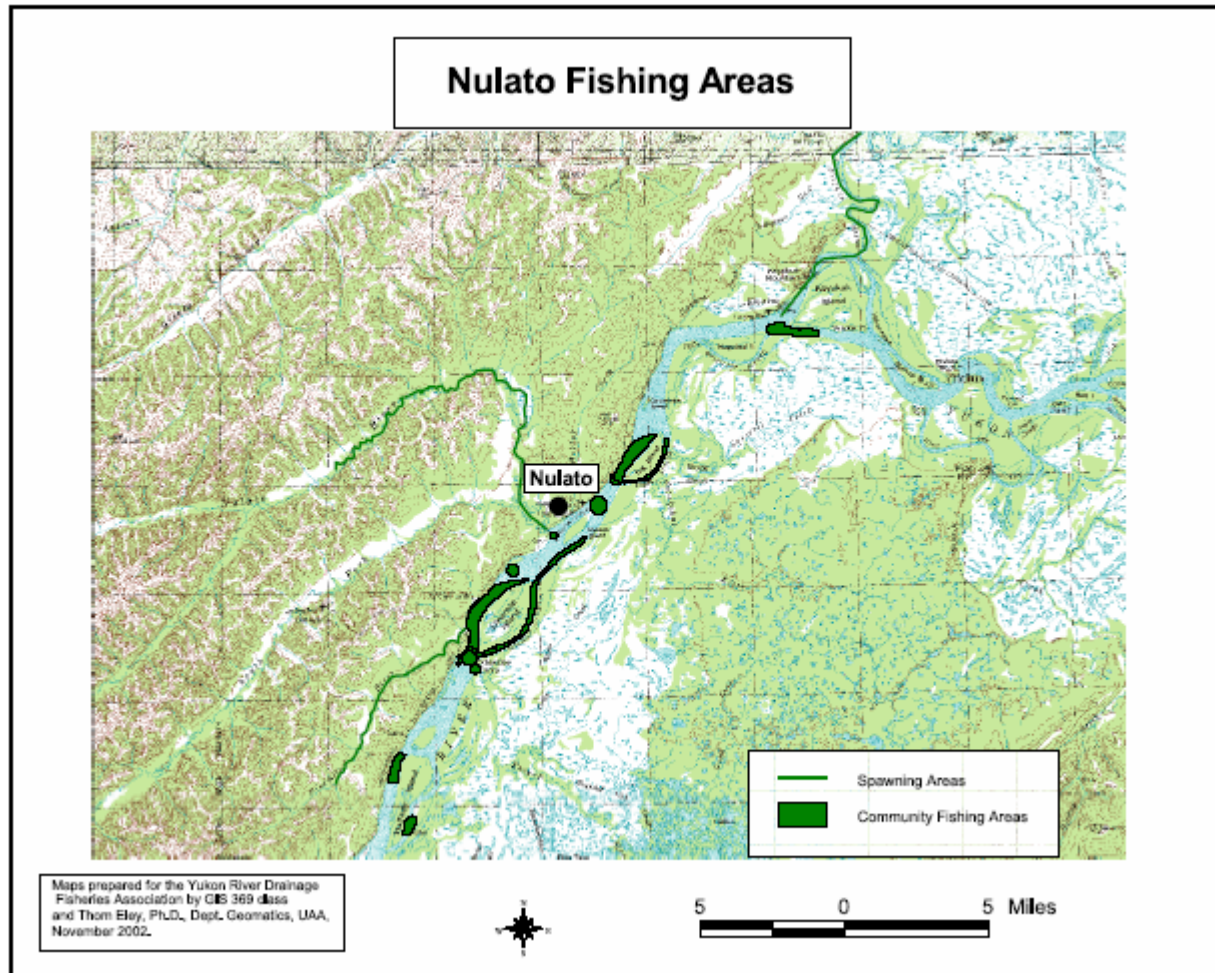
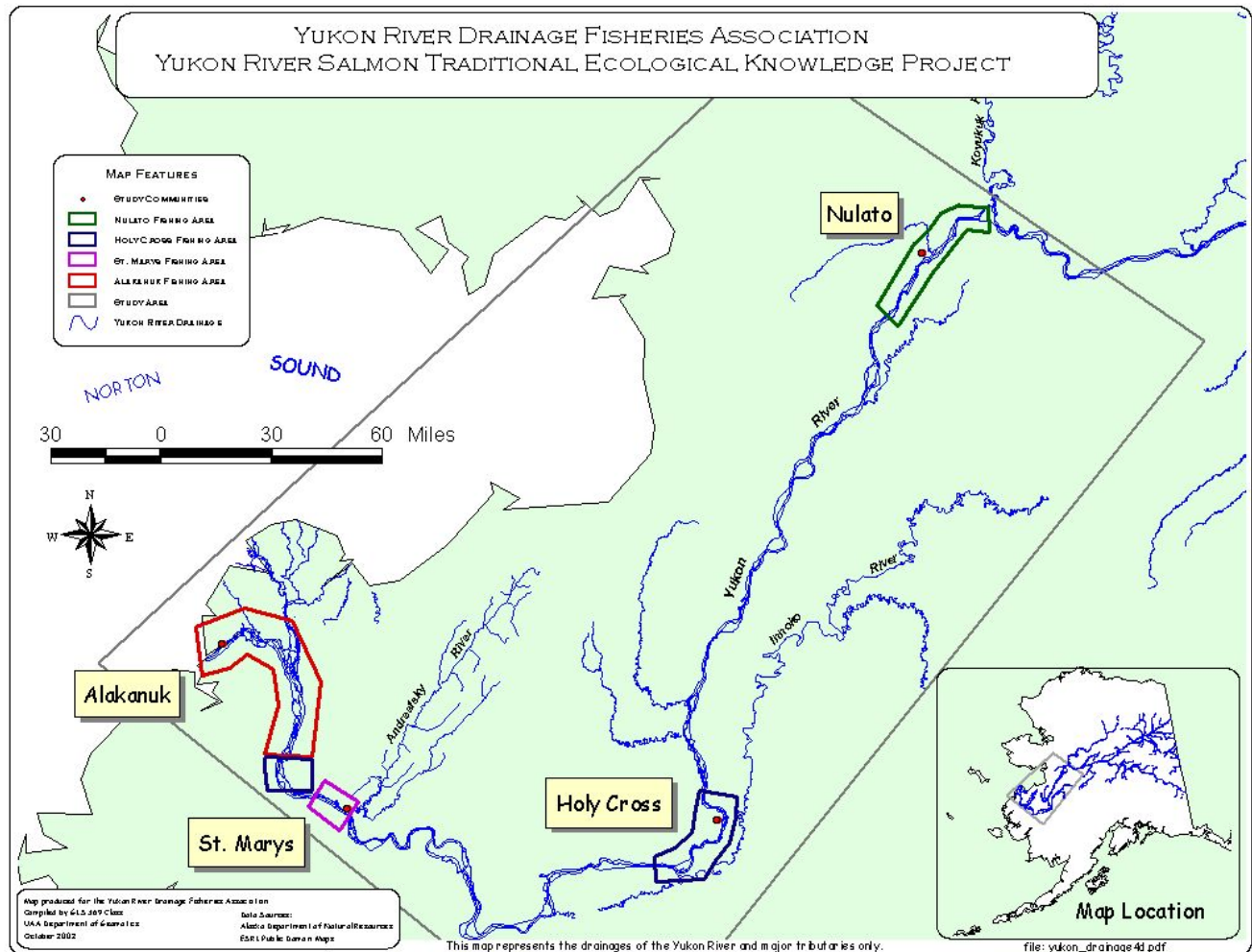


Figure 10. Map of Study Fishing Areas



APPENDIX D. Interview Excerpts



Traditional Ecological Knowledge of Salmon on the Yukon River

A project funded by the Federal Office of Subsistence Management

Interview Summary

Alakanuk - 1

Alakanuk, Alaska

June 26, 2001

Question #1) Where do you fish for salmon and how long have you fished there?

It's been quite a while. [On the]Yukon [River] and down river and up river. Flat Island, across from Alakanuk, Ugly's point (now called Waskey point), Alakanuk Slough, Fish Village, wherever there's a good fish.

Currently a commercial permit holder, learned fishing from parents. If the water is too high, you can't set nets because there is lots of debris.

In the old days, the cannery would open up right after break-up in May.

Question #2) What kind of fishing gear do you use for salmon?

35-40 mesh deep – king gear.

Question #3) When do the Kings usually arrive in your area?

From June on, depends on temperature of the water. Fish come in with Southwest wind. They come in when it is cold, cloudy, wavy and windy. The arrival of the main run is June 23rd with some variation.

Question #4) What kinds of things affect arrival time?

Its hard to predict, when they coming... Fish and game studies that.

Question #5) Can you remember any years that they arrived especially late or especially early?

Late would be around middle part of June. May 28 earliest he can remember.

Question #6) Can you remember any years when the king run was especially strong or weak?

A couple years were really heavy around 1964 or so.

Subquestion- Why are there less fish now?

A lot of things including nylon, booze, and anchors. Modern equipment came in and mow them. Then it was 4 ½ horse power to 22. Now it's 100-horse power, or 125. They go right up river and check out the mouth of the river. There's a lot of noise. They're [the fish] in shock. Take something away that they've been doing all their lives. Commercial fishing, [and] so much trash.

Question #7) How do the kings position themselves in the river?

When the waters too high, the fish spread out. When the water is low, the fish position themselves in the main channel.

Question #8) Are there different kinds or stocks of kings in this area?

Some have white noses but not all. It's supposed to be the main run. They are going way up river. No gravel beds until you get to St. Mary's

Question #9) Can you remember seeing kings in the past that were not healthy?

No, Some fishermen say that some fish have spots on them, [but] I don't know what they mean by spots. Spots on side.....not like old days. When you see plane once a month. Now you see them everyday.

Had one diseased king this year (2002). A few years back the fish had some sores. We don't use those ones.

Question #10) Do you think the kings are the same size now as they were in the past?

The same now. This year (2002) there are a lot of jacks (small king salmon).

Question #11) Do you have any information about where king salmon spawn?

Some have white noses but not all. It's supposed to be the main run. They are going way up river. No gravel beds until you get to St. Mary's. They go where gravel beds are and mountains. White noses go to St. Mary's and beyond. Too much gear out now and modern gear and boats, hurting the runs.



YUKON RIVER DRAINAGE FISHERIES ASSOCIATION

Traditional Ecological Knowledge of Salmon on the Yukon River

A project funded by the Federal Office of Subsistence Management

Interview Summary

Alakanuk-2

Alakanuk, Alaska
June 26, 2001

Question #1) Where do you fish for salmon and how long have you fished there?

In the past, he fished north of the Yukon River with his parents and Kwiguk slough. When on his own, in the same areas. Joseph commercial fished elsewhere, based on abundance.

Question #2) What kind of fishing gear do you use for salmon?

In the past, Joseph used fish wheels until state regulations prevented their use for subsistence because it caught too many fish. Dip nets and cotton made mesh nets [were used] that would need to be taken out of water and dried so as not to decay. He also used smaller nets to match smaller boats. Today he uses nylon nets for king and chum. Short to about 50 fathoms. Mostly used 25-fathom nets. Mesh size: standard 8-inch king and 6-inch chum.

Question #3) When do the Kings usually arrive in your area?

The first king salmon arrives after break-up in early June, end of May. They never come earlier and not much later.

Question #4) What kinds of things affect arrival time?

Weather. During winter months, when the winds are from south the fish go up towards the north mouth instead of the south mouth of the Yukon River. Winter winds from north hit coastal region and south mouth gets salmon.

It is always by the weather. Good strong winds meant greater numbers of fish. Bad winds, or lesser winds mean weak or light runs. South winds means more fish in the North mouth. North winds mean less fish in the north mouth. Easterly winds in winter mean fish would go to the northern part or north mouth.

Question #5) Can you remember any years that they arrived especially late or especially early?

Arrival times and amounts would always change.

Question #6) Can you remember any years when the king run was especially strong or weak?

More fish at first, means less to follow. Less fish at first means more to follow. More fish at first meant the second and third runs became lesser and lesser.

Subquestion- Why are there less fish now?

In the past there were less fishermen catching more fish. Today more fishermen catch less. People on the coast catching more fish, leads to less fish in river. When winter winds are mild then there are fewer fish. They only caught what they need. The commercial season and processors have led to less fish now.

Question #7) How do the kings position themselves in the river?

Fish prefer windy side of the riverbank. They [the fishers] would move around to be able to get more fish. In the coastal areas, when the water level is high that means fish are in more places than the channel and are hard to find because they are more dispersed. When water levels are low, fish are in the main channel and eddies and easier to catch. South and middle mouth are similar and have this same pattern. They used to set nets close to camps because of lack of motors to go out farther and drift.

Calm water means it is harder to catch the fish because they are in the main channels. In calm and sunny days, the fish swim deep in the channels, too deep for the nets in the main channels.

Question #8) Are there different kinds or stocks of kings in this area?

King- First fish may not be large but then larger fish would come later or this could be reversed. They were named. The first fish were called “aciirturtet”. These are the very first runs that ran under the ice at late break-ups. Now it may be different because the ice break-ups are now earlier. Winters now are milder than when Joseph was younger. When the first run of king salmon have dark spots under their chins it usually is a sign that a greater run is coming

Chum- spring numbers low, then fall Chum would arrive in greater numbers. Three main runs: spring, fall and Coho. The numbers varied each year and there was a seesaw affect, up and down.

Joseph judges the fish by little fin (adapus) in front of tail. He is not really familiar with this but he used to hear from his elders that the further forward the adaptus fin is, the earlier the run. When it is closer to the tail then the heavy run comes later. When the fish are heavy in beginning, the adaptus fin is further from the tail when fish arrive early. When they are heavy towards end, the fin is closer to the tail when fish arrive later. This is a way of predicting runs.

Question #9 Can you remember seeing kings in the past that were not healthy?

King and Chum: There are times when the fish have white spots. These fish are not for human use, he would use these fish for dog food. Other non-salmon species used for dog food were thinner. Since the beginning of when he started fishing he has seen a few/some fish with this. Hasn't been cutting fish now, so he doesn't know if its increasing now but his daughter had one like this recently.

Question #10) Do you think the kings are the same size now as they were in the past?

They are about the same size. Once in a while he would catch a large king but hard to catch cause they are so big. Doesn't fish right now so can't say for sure but thinks they're the same size, relatively. The largest one he ever caught was close to 100 lbs. Some are big but usually not that big. King Salmon 'jacks' have always been seen, in the past and now.

Question #11) Do you have any information about where king salmon spawn?

Joseph doesn't know exactly where king salmon spawn but he sees red kings in the Yukon River. He sees burbot and whitefish smolts in the head lakes. Now the lake is being filled with silt from Yukon breakups, possibly. There may be battery acid in that lake. He found a battery acid container in the lake some years ago. Fish seemed fewer later, sheefish etc. There haven't been high numbers of small fish there. He goes berry picking there. Something affected fish there. He thinks ADF&G were there studying fish. Float planes there too and tents. These things are causing decreased numbers of fish. Doesn't know who they were. Fishing and hunting used to be peaceful, no arguments; regulated by the people. Fished for themselves and those that didn't have someone to fish for them. Surplus was shared with them. There is a need to be concerned about respect for the animals. Animals don't disappear; only when people don't think of them or care for them the right way. Now arguments lead to birds and fish to disappear. Even ones they don't hunt for. Usually fish each year used to use traps; when fish weren't where traps are they didn't catch then and led to shortage later in year. Calm water fish in channel but traps couldn't catch them because along the shore.



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Interview Summary

Alakanuk - 3

Alakanuk, Alaska

June 27, 2001

(First 2 questions come from interview notes)

Question 1) Where do you fish for salmon and how long have you fished there?

I know the fishery through being with my dad and brothers processing fish and starting at 9 years old. Fishes at Big Eddy, etc. (See map notes)

Question 2) What kind of fishing gear do you use for salmon?

For king salmon, 9 inch mesh, nylon for large fish, 8 ¾, 8 7/8. For chum salmon, 6 inch nylon, 5 7/8 inch nylon. The processors gave these out.

Question 3) When do you think the kings usually arrive here?

Depends on break up. The come in about 5-7 days after the ice moves out. That's when we catch our first king. That's been pretty consistent over all the years I have been fishing or been around fishing. King salmon come in as early as the 25th of May. The hooligan or the smelts come in first and then you know the kings are coming in. Smelts usually come in a day or two before the kings. The main run of king [salmon] hits between the 20th and the 27th of June. Some years later, some years earlier. But anywhere from about the 20th [of June] to the end of the month. Somewhere in that time span the main run comes in. And then it runs consistently for three days. The main run is coming through now, and today is June 27 [2001].

Break up is the main consideration for arrival of kings. I've never seen a king caught under ice in the spring. I've always caught sheefish but never kings. I've caught chums or silvers in Nov or Dec under the ice but never before the breakup.

Question 4) What kinds of things affect arrival time?

[Through] my experience and with my brothers' knowledge and my knowledge over the years, [I know that] when we have south easterlies all spring long and during breakup, it tends to blow the fresh water and the ice up north. And when the kings hit that fresh water then they come in. Now, if we get south easterlies all spring the water [is] up north so the north mouth and middle mouth do well. And south mouth gets a few stragglers. But if we have a lot of northwest winds all winter or all spring and then when the ice leaves, doesn't matter you know, [the wind] tends to switch to the southwest, usually after the ice leaves and that's where the South mouth and Black River do well.

So the winds, definitely spring, seasonal winds really affect the arrival of the salmon. But I haven't really studied it hard enough, you know where I collected data all winter long on what the prevailing winds were during that winter and made a correlation between that to the arrival of salmon. But you know I can tell by springtime and how much time the water has, fresh water leaving the area has, had and where it's at in relation to the arrival of the kings.

Jill So it mostly affects location versus time, arrival time?

Location versus time, and sometimes they do spend more time out in the Norton sound, you know they'll catch Yukon kings up Unalakleet River or up around the mouth of the Unalakleet river. And

I've seen kings caught up there when I was herring fishing. And they were most likely bound for the Yukon. So sometimes some years they do swim around out there. All of a sudden they school up, maybe when the weather is right, and come in. And some years we do get water marked kings that are going to the Andreafsky or to Innoko River or closer, Alaska portion drainages.

In the spring, Southeast winds blow water up north, then the salmon go in the middle mouth. They smell the water. When it blows from the Northwest all spring, the water is pushed south and the fish go to Black River and then into the South mouth. In June at the coast, you want high water and westerly winds to bring the fish into the South mouth. The spring winds affect where the fresh water is out in the sound.

#5) Can you remember any years that they arrived especially late or especially early?

Oh I've caught kings as early as May 26. And that was back in '85. And before that, when I first started commercial fishing, we always set our nets June 1. Sometimes we'd catch kings the first day we have out nets in the water, the first commercial opening. And I've never seen kings come in later than about the 3rd or 4th of June. They've always come in between 5-7 days after the ice left and if it's a late break up, like June 1 or June 2, a couple of days later the fish come in. But I've never seen it dead till like the 15th of June. I've always seen kings early. And the summer chums, when I was young, used to come in about the 20th, between the 15th and 20th of June, they'd start arriving. And then the ones we'd get in July would be locals. So they'd be really watermarked and once it's ready to spawn, you know calico. The July summer chum. They'd be going to local, closer, just like the Andreafsky, the Clear Water and Anvik.

#6) Can you remember any years when the king run was especially strong or weak?

I know all species come in cycles and over the years, many years ago, like 25 years ago there was hardly any fish or even 50 or 75 years ago, there was a point where there was fewer fish coming to the Yukon. Not **no** fish, there was always fish but they were either harder to get, or you didn't have the right gear. Some years they were less numbers or more numbers [of fish]. Depending on the environmental conditions of that year for that stock.

They've always got fish. This is the first time in my life, or even my dad's life, that there's fish out there but we can't harvest if commercially. We can get all the fish we want [for] subsistence, even last year we were able to but the numbers, something was wrong with the counter or the numbers were low return and that's part of the life cycle of the salmon

Sub question- Why are there less fish now?

There are a lot of factors: there's the ocean conditions, there's the rearing grounds out in the Pacific and what the salmon have to compete for, with other farm raised or hatchery and released out into the North Pacific. And how much food is available out there, the water temperature and water currents, the other environmental factors such as the El Nino and return per spawner, the amount of the fish. Another environmental factor would be you get less return per spawner because of the disturbance in the spawning beds and also because the weather conditions in the spawning ground. You know if it's a cold winter and the water level is low, it tends to freeze out the spawning

grounds. Kills a lot of the live eggs, the fry. If you don't make escapement, you know return per spawner is low. But there's an optimal yield I think, return per spawner. If conditions are perfect and you can get the kings to spawning ground, you know [you] can consistently get a minimum of 3:1 return ratio per king depending on predators along the way, in the ocean to leaving the... You know kings stay up here 2 years and then they go up to the ocean for 3 to 6. Different years, its different things.

[Another thing is] mining up in the drainages. That's another factor, large factor in contaminating spawning grounds. And I, soon as the Yukon allowed roe take, you know selling of roe further and in other portions of the river, that's what really screwed up the whole fishery. Salmon roe. The concentration on roe stripping is 'catch as much fish as you could and even if it's a ratio of 50% female'. You're going to catch 5,000 chums, just say 2,500 of those chums are females. If the return per spawner is 15, and you multiply 15 times 2,500 and you see where the problem is? And down here our focus isn't on the roe. An average family might take 2 or 300 chums and in those 2 or 300 chums, a hundred to a 150 might be females and that 100 to 150 has been consistently, you know, it's been consistent.

Further up the river the, there if you notice the data over the years, the subsistence take has really been on the increase because of dog kennels. And they claim that that's been traditional and you know, appropriate. You can just look at the numbers. Last year or the year before, a person, his fishery brought in 30,000 chums. 15,000 chums could have had up to maybe 15 or 20 per spawner. You multiply that and that's a lot of fish that could have gone to the spawning grounds and yet that roe was sold. And the fish, subsistence fish, I don't understand this, but the subsistence fish was dried for a dog team which races for money, which is a commercial entity and it's a grey area. You are mixing subsistence taken food to win money. If I was to have a kennel down here, even if I was a dog musher and there was no air mail planes or planes, or cars or automobiles or anything and I was to put away subsistence dog salmon for my dog team and I was hired by the government to haul mail, that would be considered a commercial entity. Just like trapping is a commercial entity. You have to buy a license to be a trapper. So, using your dog team to trap is even a commercial aspect. And I think true subsistence is, 'you depend on that to eat'. Whether it's the roe, the head or the whole carcass. You're going to eat that. You're not going to sell the roe, you're not going to sell the dried fish to the dog musher, you're going to use that to live on. As soon as you start using it to the dog team to go trapping, which is, an elder from Galena told me, people have to be crazy if they're still trapping with dog teams and getting wood with dog teams. Cause its more efficient and [less] time consuming to use a little snow machine. Cheaper than a dog team. Maybe that's a bias again. [laughing] But that's true. The roe, sale of roe started in the late, mid to late '70s, and the Department [of Fish and Game] started figuring it out, you know, 3, I think 4 years ago was the last year they were able to sell roe up the river. You cannot legally sell roe unless you took the salmon in commercially. Its still, if there was a commercial opening right now and the processor bought a whole carcass king from me and it happened to have roe, he can sell it along with his product. That's a byproduct of the product, you know, most of the time its beneficial.

Nowadays we've got lot of other impending or competing forces with that: more efficient fishermen, the pen reared or the farming salmon. So it really depends on a lot of things. So you can't point your finger to just one thing. Well I guess you could, fish and game management.

There are a lot of really good spawning grounds up the Yukon but, they've been torn up by the mining companies, and by the raw sewage going into the Yukon by the Canadians. That's a major issue. The mining [and] the raw sewage.

#7) How do the kings position themselves in the river?

If there's a lot of trash in the river, then they either swim deep or they stay right in the channel. When the water level is low, then they are right out there in the middle. It depends if it's stormy, and the weather, perfect fish weather, which is about 20 knots south westerlies for the south mouth. They swim higher, at a higher level; they don't swim as deep when it's calm. The kings tend to swim deeper than the chums. When it's rough, salmon tend to rise in the river. They probably surf with the waves to help them with momentum in the river.

When the water level's high, my spots usually do well. But when the water level is high, the kings usually spread out. But if there's a lot of trash in the river, then they either swim deep or they stay right in the channel. When the water level is low, then they are right out there in the middle. It depends if it's stormy and [if] the weather [is] perfect fish weather, which is about 20 knots south westerlies for the south mouth. They swim higher, at a higher level; they don't swim as deep when it's calm. The kings tend to swim deeper and even the chums.

#8) Are there different kinds or stocks of kings in this area?

Sometimes they spend more time out in the Norton sound, they'll catch Yukon kings up Unakaleet River or up around at the mouth of the Unakaleet river. And I've seen kings caught up there when I was herring fishing. And they were most likely bound for the Yukon. They school up maybe when the weather is right and come in. Some years we get water marked kings that are going to the Andreafsky or to Innoko river or closer, Alaska portion drainages.

The first run of kings or the first group of kings we get, they're robust and silvery. [They're] going up into Canada. But the middle run, which is the whitenose, [are] the main run because there's a bunch of them. The white noses are most likely going into Canada, into the Porcupine, into the Tanana, and other spawning streams in the Yukon drainage. They are more water colored and slimmer. They are going through, near streams, near spawning grounds. Usually the main run hits between the June 20 and June 27 to the end of the month. Some years it's later, some years it's earlier. Some where in that time span the main run comes in. And then it runs consistently for 3 days. So you get a variety of kings at that run. You get the Canadians, you get the local and you get the mid drainage kings.

The kings- When they're red, they are going to the Andreasky. When they're REALLY red, right at the mouth of the Andreafsky, that's when my grandfather had raised his family, that was before Andreafsky was even there, before St. Mary's was even established. My mom would tell stories about how if they fished close to the mouth of the Andreasky, the kings would be really red, they didn't like them so they moved further down so they could intercept the fish that are going through the rougher, murky water, not in the clear water.

Then the last run up there in the early part of July tends to go locally like the Andreasky, they know there's some up the Clearwater, probably up other, closer spawning streams and drainages in Alaska.

#9 Can you remember seeing kings in the past that were not healthy?

I think it [ichthyophonus] has been around because it's been around with the herring. The herring have always had it that I know of. Some years it's not as noticeable down here at the mouth. But you know, interpreting other people's data and Fish and Game's data and other research over the years, it's been really brought out in the open because maybe it has happened before in the past. Maybe because the ocean currents or a lot of other things going on, the pollutants in the water are in greater numbers than in previous decades. And what was noticeable in 1999-2000 was the shape of the kings. Those years the kings were smaller in size, torpedo kings. They had larger heads with the smaller, slimmer bodies. They didn't have the big robust bodies like they [the fish] do this year, big robust silvery bodies. They [the torpedo fish] weren't malformed just slimmer fish. Those tend to have more ichthyophonus disease than [the] bright ones.

#10) Do you think the kings are the same size now as they were in the past?

Some years more of them were smaller and some years you get some gigantic kings. It's been 20 years since I got huge kings. Twenty years ago, my average kings, when I averaged first or second period, it was 29 pound average. Since then the average has drastically gone down. Depending on where I'm fishing. Usually when I have a really good eddy, which Yup'iks call a [gumana?] that's where the big kings rest, and I tend to catch those big kings. I think the largest I got on my own, was in '81. I got two at one drift. Well I had a lot more kings than that but two large ones and they were caught together. One was a 78-pounder and one was a 69-pounder. [It] depends where you have your net hanging. And some of the larger fish like to rest more than the slim ones. Over the years, my brother, up in Big Eddy, he always caught large kings. And in the eddy itself, and then we start running into [?] and that's where we get the smaller kings.

Since 1998, when the runs haven't been so good, you can still catch a few larger ones but the majority of them would be the torpedo kings. That could have been genetics when they spawned that year it was special or they didn't get enough food out in the ocean or in their rearing ground or ocean conditions affected [them].

2002- On average they are not the same size. When I was a kid the average was 30 pounds, now the average is about 22 lbs. We've taken the seven to ten year olds. Now we are catching the five to six year olds.

#11) Do you have any information about where king salmon spawn?

Yes, over the years, the first run of kings or the first group of kings we get, they're robust and silvery. We know, definitely they are going up into Canada. But the middle run, which is the White noses, and they are the main run, when the white nose come in, they are considered the main run because there's a bunch of them. And they're most likely going into Canada, some into Canada, some into the Porcupine, some into the Tanana, and other spawning streams in the Yukon

drainage. Then the last run up there in the early part of July tends to go locally like the Andreafsky, they know there's some up the Clearwater, probably up other, near, closer spawning streams and drainages in Alaska.

It is the main run coming in now; you get a variety of kings at that run. You get the Canadians, you get the local and you get the mid drainage kings. The kings that swam on the north bank tend to travel either into Canada or into the Porcupine. Or even Anvik, where they spawned up there where the north drainages. The salmon on the south side of the river tended to go Tanana and the other drainages located on the south side of the Yukon, different drainages up in Canada, probably up to 50 or even 60 % of the kings spawn. And they do need the special gravel beds to spawn on the upwellings and the upwellings need to be a certain temperature and they need a certain snow cover to maintain them from freezing and drying out and stuff. There are some of those spawning areas even nearby say up the Clear water or up the Atchuelinguk or even Andreafsky. And they do have upwellings, so called springs. And they are a certain temperature. They don't get below 32 degrees, that's for sure. The Andreafsky and the Clear Water (which is the English name of the other Atchuelinguk below Mountain Village) are the near ones. There are other area drainages that have king salmon spawning but it hasn't been researched, a lot of my information I got over the years came from the Department [of Fish and Game].

Other comments:

My experience with Fish and Game is they've always wanted to say that, if the ice left out before June 1st, no [fishing?] earlier than June 1st. When they should do is come in and set their test nets and doing their testing five to seven days after the ice leaves the river. But they usually want to wait until the water temperature [gets to the right level] and all this or a date. They're on a schedule and they follow it. They really shouldn't because that's not how nature is.

There is one thing you can do. And it'll cost money. Its pay the people along the whole river, the commercial fisherman, a certain amount of money for two group years, for 12 years and allow no commercial fishing but give them money every year or an average money for how much they would normally make, some years they make more than others. Just take an average. And allow severe limitations on subsistence. You know, close the river, open it for say a family needed 300 chums, pay them but allow them to take 1/3 of that, say 100 chums [to] help maintain their subsistence lifestyle, their traditions that they usually keep and their subsistence diet and pay them for the rest. You know what it normally [costs], maybe more than 9 cents a pound, it may be when people get compensated when they get sued for certain things. They get a high level, it costs money but that's a way to deal with it and that's probably the only way to deal with it now. If the department and the feds want to see high returns per spawner or they want to see more fish coming back. Severely restrict the mining up in the drainages. That's another factor, large factor in contaminating spawning grounds. It would if they paid people and restricted their subsistence take.

Have permits and people along specific areas of the river. They are fighting for subsistence, they are claiming that they depend on that but they are feeding it too their dogs and they are black marketing the roe. So maybe we need to work with the Canadians besides cleaning up the water and the spawning grounds. We need to rehabilitate, big time.



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Interview Summary

Alakanuk - 4

Alakanuk, Alaska

June 26, 2001

Question #1) Where do you fish for salmon and how long have you fished there?

Flat Island, for about 30 years both with my dad and on my own. I quit last year because of my back. I've got arthritis in my back.

Question #2) What kinds of fishing gear did you use?

[During] king salmon season I use only king nets. When its open [for] chum [salmon], I use chum [nets]. [Mesh size] 8 ½, 8 ¾. [For chum] 6 inch. I use only 2 nets.

Question #3) When do the king salmon usually arrive in this area?

We used to start June 1st, few [fish] but started June 1st but sometimes when there's early break up they come in May. But we don't fish in May for commercial, only subsistence. Sometimes they used to come in before June 10.

When its early breakup, they'll come in May. [The] 1st kings [arrive] in May. Like couple years ago, when we had early break up, they came in May. They first catch [king salmon] in May. But this year, we had late breakup. Right now there must be lots of fish swimming past. That's good. That's good when they pass and go up river.

Question #4) So what kinds on things do you think affect the arrival time? (breakup or weather or wind and water levels.)

No wind, west and north. Before break up when it starts, winds from west and north usually bring fish. South is not so good, this mouth. Only north mouth and middle mouth, is south winds.

Jill Klein South wind is good for north and middle?

But wind is good for south mouth. When it's a late break up, after break up they usually come, not before breakup.

South wind is good for North and Middle mouth. West and north winds are good for south mouth. When the west wind comes in with high water, fish come in through the south mouth.

Question #5) Can you remember any years that the salmon, the king salmon came in very early or very late?

I don't remember. We used to start fishing in June 1st. Usually start coming in around June 10. We're supposed to go back to June 1st again but we can't [because] Fish and Game, that's who control this area, we can't go back to 1st again.

Question #6) Can you remember any years when the king run was either very strong or very weak?

In 60s was good, 70s was good, 80s were good, but 90s after the roe fishery, its getting bad and bad.

Why do you think the roe fishery is what led the runs to go bad?

Because the king salmon, they're supposed to spawn, go up river and they take the fish and they can't go spawn when they're taken like that. And I heard them crowds out there, too. They're taking king salmon too.

Jill Klein The trawlers?

Them guys working out there, CDQ, they told me they throw lots of fish too. That's how the Yukon River is hurting.

Question #7) How do the kings in this area place themselves in the river? Do they swim deep or shallow?

When we are fire fighting inside of Kuskokwim, one time I watched the king salmon and chum. [A] chum [salmon] went up a stream, right in front of our place, there was a hole. But below that hole its only this deep [showed on his ankle]. Fish stays right here in there. Maybe more than 24 hours stays, maybe they were sleeping or resting, in the deep, deep. [Its] the same way in the Yukon River. There's a hole, deep hole, they stay right there. And when they stay like that, when there comes the fisherman and they fish right over. They can't catch fish. And they say that there's no fish. They're way on the bottom. And you can't catch them like that. And some eddies its really no good. They change, them eddies, every year. When you have a good spot, maybe two, three years and no more good. They don't go that place no more, they have to go around. They go down, go up or go out or go in [lots of hand motions] same way the king salmon swim like that. Some eddies are no good. You can't get nothing. Some place is good, really good. They go one place. Like that's really good. You know them fish, they don't go same place every.... They go different route. Fish always change their route.

What about the banks that the fish swim? Do the fish swim on the north or on the south?

Either way, they swim either north side or south side. They go, them fish when they are swimming they go other side or this side. I don't know why they do that. The way the fish, they knows, the fish, I don't know anything about [that], the fish, they knows. Its down there, [near] Flat island, I used to fish on south side, the mouth, the north shore and north side. I used to catch the one, I skipped from net on this side, my net was really good right there. Catching lots of kings and one break up, [they were] gone, the eddy was gone, no more good. Too much current.

Question #8) Are there different kinds of kings in this area? Like kings that look different from each other.

Some of them have a white nose, them big ones. Some of them had a black spot right here [pointing to neck under chin]. Some fish have white noses and black spots, some have only white noses or only black spots and some have neither.

Is there anything different about where those fish are going or what time they come into the river?

This time [of] the year after middle of June [they come in].

Do you think those white noses are going somewhere else? Like that they go together to a specific part of the Yukon?

I guess, I don't know where they go but they go up the river somewhere. I don't know up river, only this area.

[The black spots], sometimes they come in early. The elders they used to see, [Yupi'k] the ones that had black spot, they up north fish. That's what they used to say. One time they were mixing the black spot and the kings up there. There was lots of fish up there in 1960. Lots of fish. First time when I fished in Flat Island, [there were] lots of fish.

So are there kings that come in, you think, that are headed to specific places in the Yukon, that you notice?

I don't know.

Question #9 Can you remember kings in the past that weren't healthy, that had disease?

I've never see a king, diseased ones. Only chum salmon, some of them have big sores on the body. Chums. But I never [have] seen a [diseased] king.

Question #10) Do you think the kings are the same size now as they were in the past?

They're same. I used to get small ones and big ones. Like this. [hand signs] They come in some small ones, seem like this small. I [have] seen one this big. [shows about 6 inches with his hands] real small.

Jill Klein But you think they are the same sizes now that were in the 60s?

I don't know right now, I didn't fish. I don't know about fish right now.

Question #11) Do you have any information on where the king salmon spawn?

There I know them king salmon spawn below Mountain Village in Andreafsky River. Below Mountain village that they spawn, the Atchuelinguk, and Andreasky River. Above Andreasky, above Pilot Station, Atchuelinguk, Innoko. They said that in paper they spawn, king salmon, right

there. [In the] slough. Maybe some of them above fish village. They must be out in fish village too.



YUKON RIVER DRAINAGE FISHERIES ASSOCIATION

Traditional Ecological Knowledge of Salmon on the Yukon River

A project funded by the Federal Office of Subsistence Management

Interview Summary*

Alakanuk - 5

Alakanuk, Alaska

June 25, 2001

*Interview conducted in Yup'ik, English portions summarized

Question #1) Where do you fish for salmon and how long have you fished there?

He's been fishing in the immediate area here, mainly between Alakanuk and Flat Island. And he started this first fishing back in Jack Emel cannery, in old town site. That would have been back in, somewhere around 40s or early 50s.

And now does he fish in a different place?

Now in the slough. In the vicinity here [see map notes], in the slough and on the Yukon. During commercial season, fishing was mainly on Manning Island and Flat Island, but since he's retired from fishing, he doesn't fish commercially any more, he fishes in the immediate area.

Question #2) What type of fishing gear does he use for fishing?

He used both chum and king salmon net. For king he uses standard, 8-9 inches. He's been using standard commercial fishing gear for a long time, both for kings and for chums. For kings he used the [?] But for some he used 6" nets.

Questions #3) When do the King salmon usually arrive?

They come early in June. Steady every year. They seem to come the first part of June.

Question #4) What kind of things affect the time that they arrive?

Mainly the different weather directions at the time when the fish arrive. Wind direction affects which mouth the fish enter. When there are winds from the west or southwest there's more fish in the south mouth. When south winds change to west winds and there is a high tide, then fish enter through the south mouth.

Then if it's mainly south or easterly winds then the fish bypass the south mouth and enter through either the middle mouth or the north mouth. It's always been that way. Sometimes fish; depending on the weather and the winds, the fish enter the south mouth more than they do in two other mouths.

JK Is there anything else that affects the time that they arrive? If they arrive early in June or late June or July?

Temperature. Well, the other part of that, by the winds. Northwest winds from the Bering Sea, bring colder air.

Question #5) Is there any time in their history that they can remember that the salmon came either very early or very late?

As far as they remember, the fish come in the early part of June.

Questions #6) Can you remember any years that the King run was especially strong or weak?

Since he's been fishing, in the early parts there have always been fish. But through the years fish numbers have been decreasing. And the place where they stayed, that's where they fished, that was before commercial seasons began around here. And there was plenty of fish at that time. And sometimes they'd used dip nets to net for King Salmon and in the dip net sometimes they would catch 2 king salmon in one sweep.

What do they think has led to the difference that there was more fish in the past versus being less fish now?

His feeling is that in the past, the way the old people take care of the fish was, they watched the fish really carefully. And they used every part that they could use and they threw away very little. And what they threw away they didn't throw in the river. Today with the commercial season, even part of the subsistence activities, different parts of the fish that are not used are thrown away, the heads, the guts, mainly into the river. When they go out to rivers out there to do subsistence activities they notice a lot of trash in different parts of the river. They also feel that fish runs are weaker due to fishing in the Aleutians in more recent times.

Question #7) How do the kings in this area, around Alakanuk, position themselves? When they are coming in the river are the kings around close to the shore, are they in the middle or does that matter? Do they know the status about whether they are deep or shallow?

It depends mainly on the fish or the weather. When the weather is generally calm, the fish tend to stay in the deep water.

It also depends on the tides. When the tide comes up, fish follow the tide and take shortcuts over the sandbars. If it's a strong tide, fish will swim in the center where it is calmer. Kings are bigger and they go deeper. If the tide is high, they'll go where they are able to go. At the high tides they leave the shallow areas. Also, they prefer eddies.

But it also depends on the direction of the wind, where the wind is coming from. When the wind is on the north side then fish are on the south side. He [John] is always amazed at how the wind and the weather affect the fish, both on the coast and inside the river. Fish always go where the wind decides. They go to the windy side. If it's blowing from the south, north side has more fish. If it's blowing from the north, south side has more fish.

Question #8) Are there different kinds of kings that swim in this area, or kings that look different or go to different places to spawn?

There are 3 groups of king salmon. First group is always the fattest. The middle group is leaner. And the third group is the leanest. And that's when they start changing color. It's usually the same around here. Sheefish, Black River. The only ones that they are really aware of are the last ones

because they start changing colors and so you know how fish are responding, their teeth starts growing.

And do they think that those 3 different kinds of salmon are going different places on the Yukon river?

They don't know which places they go.

Question #9) Can they remember seeing kings in the past that weren't healthy? Do they remember seeing parasites or things in the eggs that weren't healthy?

In the early parts of their life, the salmon that they saw were healthy. But during the recent years they have been seeing salmon that had sores on their bodies and not too long ago they saw a salmon that had some kind of sore on its body. There were no scales on this spot. It had no skin on that part of its body. Sophie she cut that piece off.

They haven't seen fish like a long time ago, it only recently seen those. And in a recent meeting held in Nikolai [?] was the first time they heard about fish like that. Sores. Mainly sores.

Question #10) Do they think the kings are the same size as they were in the past?

The first run was always big, and the second run smaller in the old days. Today it is not this way. They used to see larger kings in the past. But the average size is the same is the same as in the past.

Question #11) Do you have any information on areas where king salmon spawn?

They don't know any place where they salmon go. All they know is what they heard that salmon go to spawn upriver.

Other comments:

Wasting any part of the fish. At times people have left fish without taking care of them, like leaving them to rot. They think that those are some of the things that are helping to make the fish decrease.

If they took better care of the fish and disposed of unused parts of the fish in the right way then...

JK What's the proper way to dispose of the unused part?

In the place when they were young, they saw that the people took as much as the fish as they could. They took the meat the head, the stomach. They only part that they threw away were the parts of the stomach that were not used. They took the stomach and the eggs. They reserved those for themselves and for their dogs. So very little, if anything was thrown away. The only part of the fish that was thrown away was the insides that were not used. They used the stomachs and the eggs. The other parts they threw away. But the heads and the body they uses. The heads, sometimes they dried and sometimes they threw away for dog food.



YUKON RIVER DRAINAGE FISHERIES ASSOCIATION

Traditional Ecological Knowledge of Salmon on the Yukon River

A project funded by the Federal Office of Subsistence Management

Interview Summary

Alakanuk - 6

Alakanuk, Alaska

June 26, 2001

Question #1) Where do you fish for salmon and how long have you fished there?

Near Fish Village for 3 years, outside Alakanuk for 2 years. Helped Dad upriver, got commercial permit in 1995. Fished on her own for 5 years and before that helped her dad.

Question #2) What kind of fishing gear do you use for salmon?

King gear = 50 fathoms, 40 mesh deep. Doesn't know biggest size.

Question #3) When do the Kings usually arrive in your area?

Just listens to ADF&G

Question #4) What kinds of things affect arrival time?

Maybe water level

Question #5) Can you remember any years that they arrived especially late or especially early?

No

Question #6) Can you remember any years when the king run was especially strong or weak?

1999 was okay, 2000 was poor.

Question #7) How do the kings position themselves in the river?

Shallow. Along the bank. South bank swimming.

Question #8) Are there different kinds or stocks of kings in this area?

[no answer]

Question #9) Can you remember seeing kings in the past that were not healthy?

No

Question #10) Do you think the kings are the same size now as they were in the past?

Seemed smaller last year (2000).

Question #11) Do you have any information about where king salmon spawn?

No



YUKON RIVER DRAINAGE FISHERIES ASSOCIATION

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Interview Summary

Saint Mary's - 1

St. Mary's, Alaska
July 8, 2001

Question #1) Where do you fish for salmon and how long have you fished there?

We fish in different places on the Yukon River between here [St. Mary's] and Pilot Station and Mountain Village. We haven't fished for the last ten years. Our fish camp was 5 miles below Pitka's point since 1963. The boys get us fish and Teresa cuts fish at fish camp.

Question #2) What kinds of fishing gear did you use for salmon?

We used nylon nets for both king and chum salmon. 8 ½ for king and 6 inch for chum. We drift net. In St. Mary's people mostly drift net.

Question #3) When do the kings usually arrive in your area?

They arrive on June 5th, June 11th, 12th. By the 13th they hit good.

Question #4) What kinds of things affect arrival time?

Break up, when the ice goes out.

Question #5) Can you remember any years that they arrived especially early or especially late?

They arrive on June 5th, June 11th, 12th. By the 13th they hit good.

Question #6) Can you remember any years when the king run was especially strong or weak?

The salmon look more than good this year. Last year the kings and chums were poor. The past winter whitefish were small and no fat.

Question #7) How do kings in this area position themselves in the river?

They swim any place. Sometimes more fish are on the south bank than the north bank. The north bank also has lots of fish.

Don't really know. First run is not heavy, 2nd and 3rd runs are heavy with kings and chums together.

Question #8) Are there different kinds or stocks of kings in this area?

Different species of salmon; one of king. They don't look different. Later they follow into Andreafsky River and Anvik River, ADF&G site. They come later so we don't fish too much for those.

These are heavy fish with fat, too fat. The second run arrives around June 12th and they are mixed kings and chums. Around now [July 8] the king salmon are red and easy to dry.

White noses are big. They dry faster and have less oil than the first run.

Question #9) Can you remember seeing kings in the past that were not healthy?

Sometimes we find white dots, once in a while we saw it in the past. We didn't see any of it this year except in one chum. None in the kings. In 2002 there were no fish with white dots.

Question #10) Do you think the kings are the same size now as they were in the past?

This year they were big king salmon, harder to dry, too fat. Big nets equal big mesh equal big kings. Once we had a 40 lb king. Five years ago we had an 80-90 lb king. In 2002 they were medium sized.

Question #11) Do you have any information on areas where king salmon spawn?

Late kings gather at the mouth and swim up the Andreafsky River. Early fish swim upriver and are too fatty so we don't catch them.

Different species of salmon; one of king. They don't look different. An early run goes up the Yukon towards Dawson and Whitehorse. Later they follow into Andreafsky River and Anvik River. We hardly ever see white noses. They come later so we don't fish too much for those.

We don't know where they swim to upriver.



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Interview Summary

Saint Mary's - 2

St. Mary's, Alaska
July 7, 2001

Question #1) Where do you fish for salmon and how long have you fished there?

Since 1967 been fishing at camp by the Boreal on the Yukon.

Question #2) What kind of fishing gear do you use for salmon?

King and chum drift net.

Question #3) When do the kings usually arrive in your area?

June, first part of June.... This year they are late. Normally kings, normally they start about first week of June. And by the 10th, they are running pretty heavy. Normal season.

1995- arrived June 12,

1996 – May 31,

1997 – June 4

1998- June 9

1999 – June 13

Question #4) What kinds of things affect arrival time?

They are late probably because of ice at the mouth. My husband tells me when its rough, that's when they come in. A west wind and a high tide bring the fish in.

Question #5) Can you remember any years that they arrived especially late or especially early?

June, first part of June.... This year they are late. Normally kings, normally, they start about first week of June. And by the 10th, they are running pretty heavy. Normal season. A warm spring makes the fish arrive early.

Question #6) Can you remember any years when the king run was especially strong or especially weak?

No. Our records show:

1995 – 75 & 54 kings

1996 – 92 kings

1998 – 78 & 44 kings

1999 – 148 kings

2001 – 175 kings

Question #7) How do the kings position themselves in the river?

If they water's not really high, they are more or less together, easy to get a hold of them. When the water is high they spread all over. They are way on the bottom of the channel when it's high too. They spread out in deep water, like in the channel. You can't get them when they go deep.

Those red ones are Andreafsky bound fish. You can tell because you got some real fresh ones mixed with the red ones. And they're on the north side. But most of the good fish are on the south side and they go further up river. The ones on the north side here in the Yukon, they go closer by or go up the Andreafsky.

Question #8) Are there different kinds or stocks of kings in this area?

Well, I didn't catch any kings so I can't tell you. My boy, my son went out and got most of the kings. So I haven't really paid attention to the white nose we're getting. White noses only come in towards the later part of the main run. They come towards the end and they are normally big kings. I don't know where they're going but they normally come towards, after the main run.

The first run are Canadian bound. The red ones are Andreafsky bound. The White noses are the last run. In 2002 was the first year we saw blue fish, dark blue, slim and long.

Question #9) Can you remember seeing kings in the past that were not healthy?

This year I haven't heard any report of fish with that fungus. We haven't seen any. No they don't seem to have any of that. A few but years before there were quite a few. But last year it went down and this year we haven't seen any. Just about 3 years ago or so we've had that problem. You'd open the fish and there would be like pus inside. But this year we haven't had that problem around here. She [indicating Sophie] hasn't thrown any fish. For the last 2 years they've been kind of dark color and less fat. This year they are fat. They had this inside the skin, that stuff. We haven't seen any this year.

Well, last couple three years ago, they were slim and long and dark but this year they are back to fresh looking, really nice looking fish. Silvery fish. The only thing I've ever heard is that when they're slim and long that's an indication that there's lots of fish.

Seems like they're smaller, smaller than last year. But they're really fresh looking fish though. Better looking than last year. Last year they were long and slim. This year they are better, maybe like we used to when we first moved down here. They're good this year, but for last how many years they've been.... For the last 2 years they've been kind of dark color and less fat. This year they are fat. They had this like inside the skin, that stuff.

In 2002 was the first year we saw blue fish, dark blue, slim and long. In 2000 the salmon were not healthy- they were slim, long, and had dark blue scales. In 2001 they were coated with something white. A filament only the kings from moisture or oil content too low.

Question #10) Do you think the kings are the same size now as they were in the past?

For the most part, yes. Smaller than last year. This year they are better, maybe like we used to when we first moved down here. For the last 2 years they've been kind of dark color and less fat. This year (2001) they are fat. In 2002 the kings are small, more rounded than 2001 and mostly male. In 2001 they were slim and in 2002 they are wider and brighter.

Question #11) Do you have any information about where the king salmon spawn?

I don't really know this is only what I hear.

Usually the first run that comes is always Canadian bound, the Canadian fish. The Canadians think all the fish are theirs.

Those red ones are Andreafsky or Atchuelinguk bound fish. You can tell because you got some real fresh ones mixed with the red ones. And they're on the north side. But most of the good fish are on the south side and they go further up river. The ones on the north side here in the Yukon, they go closer by or go up the Andreafsky.

Comments on the Sonar at Pilot Station:

What I've heard is that they don't know what kind of fish is going by the sonar. One fish is king and the other one is chum and all that. How they go about counting this many kings went by and chums went by. They really screwed up the sonar up there, count for everything like closure or escapement and all that. Seems like they ought to maintain it better, to make it more precise. That way we could get better count and you can use it better. Because right now they're using, this much went by and this much went by. It's not even accurate or halfway close to being accurate. That's one thing that always irked me. They start cutting us down on our subsistence/commercial you know. We need to get more precise of what's going through, instead of even they don't know how many went by, they'll say this many went by. We're not having enough. Well they don't know how much went by, how could they say not enough is going by?

Well the amount of money allocated to them [ADF&G] for research, it seems like they ought to get better. How many years are they going to research before they finally do something?

When we do subsistence, we normally report or write down what we got. But normally they don't even use that for, they tell us that they are going to use it for kind of a review of what's out in the river. Seems like they don't even follow that. You know we give them a report of what were doing, what were catching.

They should rely on the subsistence catch because we go out subsistence and get what we want and that's it. It shows, we can pretty much evaluate what, say in an area, what they're [the fish] doing subsistence wise. And if that's the case, so in that area, how the fish are doing.

Do you think there's anything else that's important for Fish and Game, for managers to know that would help manage the fishery better?

Well when they started, like with subsistence, when they started keeping times and stuff like that, they ought to get people's opinion instead of just getting their own. Like that time schedule didn't work in our favor. We're lucky some of us had to go to work, 7 o'clock in the morning. Can't stay up all night.

Another thing I don't like is one week. In meetings, I brought up is that they should split that 24 hours in a week. It's not 24 in one day. It's either you get it, you get the fish or you get nothing at

all. You have to wait a whole week or two weeks. They ought to split it, partial. Gives you a chance of getting a few. None of this 24 [hours] where you either catch or you don't get any at all.



YUKON RIVER DRAINAGE FISHERIES ASSOCIATION

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Interview Summary

Saint Mary's - 3

St. Mary's, Alaska

July 8, 2001

Question #1) Where do you fish for salmon and how long have you fished there?

We've been down here for 17 or 18 years. Our first year we had another camp further up the Yukon, about 6 miles. And when we had our first two children we moved down, every spring. And then when we go fish camp, when the water starts dropping, cut bank. It gets real deep. With our kids wandering around all over, we didn't want any accidents to happen. Every time the water drops, it gets real muddy. It gets real hard. So we had to find another location. We found this place to be suitable and we've been here ever since.

It's about six or seven miles from St. Mary's. About a quarter of a mile from Boreal [fishery], or a little less.

We fish for both king salmon and chum salmon just right here in front and further down. Its all depending on, usually during the first run of fish, there's a lot of boats that are out there to get their subsistence needs. So there are quite a few boats drifting down. So wherever there's space, we go ahead and drift.

Question #2) What kind of fishing gear do you use for salmon?

Both chum and king gear. 6 inch [for chum] and 8 ¼ for king gear. I've been using both chum and king gear and my youngest boy, Darryl, he's got a little 3 ½ mesh net. And he drifts with that every summer, ever since he was 7, 8 years old. And you know that little green canoe, that's sitting over here [motioning to right]. That's his boat. So he's been doing that ever since he was 8 years old. He catches whitefish, chums and every once in a while he gets small kings with that.

Question #3) When do the kings usually arrive in your area?

Usually right after the ice goes out. When we hear Bethel catching fish, it usually takes about 2 ½, 3 weeks before they get here. They have a long ways to swim up the coast and up the Yukon. We try and catch, when we hear that there are fish down river, we try and get the first run that are here. The best time to catch fish and dry, depending on the weather conditions.

Question #4) What kind of things affect arrival time?

It depends on weather conditions. Sometimes we have a late break up in the later part of May. And our river, the Andreafsky, goes out first then the Yukon can go. Usually when all that ice clears, it takes a lot [of time], maybe a week and a half to 2 weeks before the first run of fish hit the mouth of the Yukon. When the whole river clears out of ice, to the mouth, then it takes 1 ½ to 2 weeks for the fish to arrive.

It [also] usually depends on the size of the run. When they are in small schools they swim faster, about 3 to 3 ½ days from the mouth to here. When they are in big schools of fish they take longer, they swim slower up the Yukon. When the current is slower the fish swim faster.

According to our elders, they watch the weather and weather conditions in the wintertime, especially towards spring, which wind direction we have. Usually they favor a north wind, west

wind and south wind. And towards spring, if we have a lot of east wind, there won't be too many of fish because when the tide comes up at the mouth, and the fish want to come in, [but] the east wind pushes them [out]. So very little fish come in. That happened, two years ago, I believe, in 1998. Springtime we had a lot of east wind and all during that summer we had one direction all the time in the east wind. That's the lowest fish we had in years as far as I can remember.

When there are south winds the Black River gets bigger kings. When we have north winds, which are colder, there are smaller fish. High winds, north winds and south winds push fish in. Everything except for the east wind pushes fish in.

Question #5) Can you remember any years that they arrived especially late or especially early?

I don't remember. It depends on breakup, the river and when the ice goes out. One year it was the third week of May, this makes everything late. It depends on winter conditions and it is not getting as cold in the winter as it used to.

Question #6) Can you remember any years when the king runs were especially strong or especially weak?

Early on, I started fishing in early 70s, and there were quite a number of fish back then. And every year they started to notice the decline, both chums and kings.

They seem to be more fish than last summer, the way I see it. But according to Fish and Game, they say the numbers are below average, well may be a little better than last year but you know, we're out here year round and every year. To local people, there were fish last year, in 2001. We go out and fish. This summer I make a short drift and we'd fill up our tote. That's a lot of fish. 2002 had good weather for drying fish.

I wouldn't say [what is leading to their decline] there is so much going on out there, not only on the Yukon but also out in the ocean. There's a lot of fishing going on year round, especially trawlers and those are the ones I believe are catching some of the fish that are going up the Y-K delta. For years when the trawlers started fishing out there, we noticed a decline in fish returning to the Yukon and at the Canada border.

Another thing that our elders talk about is, when you talk about our animals on land too much, when you fight over them, make regulations of how to, what part of the area that we are allowed to hunt. Back then there were no regulations, you know people were going from season to season. And our elders are saying that as the years go on, even our fish stock, no matter how you try and manage the fish, they are going to get lower and lower because people are fighting over fish. That's one of our [problems], when we talk about, fight over, for example fish, no matter how we try to get them back, to try to get more fish every year, they go, they disappear.

They have their own cycle. You could try to preserve even, like reindeer and moose, you try to preserve them, they'll go when their instinct [tells them]. So we try to make do with what we get and have. Try to. Like rabbits, they have their own cycle every 7 years. Some years there are a lot of rabbits and next year there's very few. Salmon have a longer cycle than rabbits, maybe closer to

10-20 years. The first time I've ever seen it the decline, back in '98 and that was the first one. I guess everything has their own cycle; they come and go, regardless of how you regulate it.

Some of it is even trash. How people throw [things] even in water. Most of that is pollution that is happening today, especially [by] our younger people. We tell them, you go up river [and] you'll find lots of trash. Try to pick what we could, but it's along [the] north and south forks we got to try to keep it clean [because] those are spawning areas. Even out here [there is] oil, motor oil. Gas spills, sometimes when Boreal was operating sometimes we'd even get gassy, oily water. And it's not good when we're trying to cut fish. [We have to] go further out or use rainwater or use something else to wash. It's everything, it's all, you have to try look at the whole thing. Some of it is us, humans, sad to say, how we act and behave affects everything, even our game. "We can't control fish" no matter how managers work.

Question #7) How do the kings position themselves in the river?

Well that depends on the weather. A northwest wind is good. And the water temperature. That's a big factor. I remember in '98 when we had our first, I believe, one or two openings. I usually fish on the south side of the river. There was no fish on the south side. All the fish were swimming on the north side of the Yukon. And I don't know what the reason was. There was high water that summer and there was a lot of debris out in the river that was floating down. And we had to drift in order to catch fish that summer. We only got four kings all season, which was the lowest. It depends where, sometimes people drift where they choose. And usually there are a lot of drifters. We don't set net up out here, there's no place, there's no eddies to set net so we mainly drift. So both north and south, people fish wherever there's fish available. We try and make sure that we don't wait around because of the openings we have, sometimes they give us 8 hours, and sometimes they give us 12 hours. So we try and fish without waiting.

What would make the fish swim either deep or shallow?

Right now there are a lot of boats going up and down the Yukon. When you hear motors going up and down the Yukon, zooming, going real fast, they seem to kind of go into deeper water. Boat motors pushes fish away, making them swim deeper.

And water temperature and water level. The fish like it cold. It all depends on the water temperature. Sometimes they go low, way at to the bottom when it's warm. It's all that water. That's where the salmon go, in the channels and channels change every year.

Question #8) Are there different kinds or stocks of kings in this area?

Usually the first run that comes up the Yukon is, from our elders' perspective, the ones right after the ice goes. And those are the ones that swim under the ice when the ice is going out.

We usually have 3 runs of kings. The middle run has darker snouts. The last ones are the white noses. That's the last run of the kings that come up the Yukon.

I remember when I was growing up about 40 years ago, everybody used to go out right after the ice goes out. And there was no such a thing as state regulations, 'when to fish, when not to fish'. You

know when the ice clears, everyone goes to his or her fish camp and they start fishing. Usually the first run of fish that comes up the Yukon back then was all kings. There were no mixed stock; they were all kings from June till end of June.

When the kings start slacking off then the next run that comes up the Yukon are chums, then all chums. That's my time growing up, as a child, which I remember. But today, right now, when the fish come up the Yukon they are mixed stock, kings, chums, and sometimes right around towards end of June, early part of July you are catching sheefish and other kinds of fish.

Why do you think that they are mixed now as opposed to not mixed in the past?

Part of it was predicted, by our elders that this was going to happen, even the animals. We get careless, we don't take care of it. They used to compare us even with animals sometimes, how we behaved, our attitude and behavior. We don't take care of it, even our river. It's what we're going to get. Some of it is that, I know. I never used to believe them. I used to think they were, some of them were superstitious. But you become a believer after you sit with them. You're not so young and running around anymore. From her [mother?], even from her I learned lots, even the weather, how she watches it. She has lots to say.

Question #9) Can you remember seeing kings that in the past that were not healthy?

Well there was a lot of lamprey marks back in the 70s. All you'd see was lamprey marks, what you call eel. They make little round marks on the skin.

And not too long ago, you'd start seeing these fish that come up the Yukon. When we'd catch them you know they'd look good from the outside you know that's the whole fish, but when you go ahead and gut them there's pus marks in the meat and there's little white marks on the meat too. But that's only the past few years. This year (2001) they're good.

In 2000 there were lots of pus or worms. The fish looked good on the outside but pus shoots out from inside, also white marks on the meat. The year 2000 was the first time we saw sick fish. Never heard our parents talk about sick fish in the past.

They go in cycles. They have their own cycles. This year (2001) I am pleased with the fish because we didn't have.... The last two, three years we've been having, catching kings with a lot of that white meat. This year there, I only had one that had a big white that I didn't cut. The meat was good. There's a lot of good fish out there I noticed too this summer. Even chums, a few chums had their guts stuck to their skin.

I heard one older guy, way older than me, when my aunt was talking say, 'it's getting scary the way fish are', when we were getting a lot of those pus fish, and he said, 'yea, if we get hungry, we're going to be hungry' and she said, 'no, we got the stores'. And I didn't think then, until I started listening to news about the cow and everything that was getting sick for a while out there and I really started to think, they're not going to stock us up, they are going to stock themselves out there first. We're not priority. Today I really wonder what he thinks now.

Question # 10) Do you think the kings are the same size now as they were in the past?

No, about average. They have to be the same if our elders know. You know, they know this. They know these things so, its not, they won't tell us things that they are not sure of. I caught my biggest fish ever in 2002. Other people got good sized kings as well.

I can tell you for a fact, in early, late 60s, I was collected down at Alakanuk, or Emmonak. And I used to make a run down south towards Flat Island to collect fish for commercial. There was one time I went down there towards end of closing, you know boats were starting to come in to unload, unload their fish. There was this one boat that didn't park by the LCM he parked in front. And I was wondering why. After anchored his boat, he got, he took a big king and packed it up on his shoulder, and he had to pack it all the way to the LCM because he couldn't throw it up on the side from the boat to the LCM. And when he weighed that, it weighed almost 90 pounds. That's a big king. And I saw that with my own eyes. Even my dad, he caught one once that he couldn't even lift. Took him and my brother to pull it out and put it in the boat. But I never see or hear after that one year like that.

Like out elders say that depends on the winter conditions. Wintertime when you have a lot of north wind, NW winds you have a lot of smaller fish. That's because they are from up that way. When we have a lot of south winds that means the kings are going to be bigger. That depends through the winter. That's how our elders tell signs of how big the fish; the kings are going to be. Different winds bring in different size fish. They have different cycles, 2002 brought in a lot of jacks.

Its not like fish go up and all go to one spot. We've got two, we've got chances with two, up this way or down that way.

I don't know why they are bigger coming from the south, it might be the ocean current out there. Maybe it's warmer out there or its colder up north, the water temperatures. I believe what our elders say, because sometimes when I was growing up I used to wonder, well how, how do they know, maybe they're just talking. But now I am beginning to believe what they, what the elders say. I believe them 100%.

Question #11) Do you have any information about where king salmon spawn?

Well there are two rivers, up the Andreafsky river, one called north and the other east fork. So they spawn in both forks. They go way up the Andreafsky River. Some of those places you go, those are the, you can tell, you know but the marks on the fish. I mean under the water, river, where they are. Usually when the water drops, later part of July, I guess September when we go up river, moose hunting, you can see a lot of dead fish stuff around the gravel bars.

Not sure which run comes up this way. Some fish go further up but I don't know where they spawn. Sometimes fish come up this way until November. Elders follow the winter winds and know when they'll be good salmon. Cold winter leads to a warm summer.

Other concerns:

Jet Units- The other things that I don't like up even in those two, north and south fork is this jet units. Those jet units I just don't like around that time. I don't mind them its just around that spawning time. Another scary thing that I know, that I see happening.... I like to go boating, I like to go way up river as far up as I could. Our kids been telling us we should get a jet unit but I know half the other side to that. It's another thing, the decline of fish and what affect it has. A person's got to think twice before going up the river. You know these jet units, they go in shallow water. Instead of going in the main channel, they go in the shallow water to ...And that's where the fish pond is.

New fishing schedule-I think, one of the things that we see today, the changes I see today from my childhood growing up, back when there was no regulations and our elders know, they were regulated, they know what to take, how much to take, per season. Especially summer time they used to have dog teams back then, I remember, all the fish camps up and down the Yukon, used to be their fish racks would actually be just red, full of fish. They cut fish for their own subsistence use and their, and they also cut fish for dog food. Or they saved most of their bones. Today we, I don't save the ones, like yesterday's, chum, cause they're really hard. But if we had dogs, I'd hang them. We've got one dog that's got enough to eat from our scraps. So those, heads and guts, we throw them on the other side of the Yukon, we just throw them on the ground because there's seagulls and other animals that will eat them. They just clean it about 3 or 4 days later I go back and that place will be clean. There are animals that eat what we throw on the ground. You know I don't, I [don't] disagree with our subsistence way of life because that's been going on for thousands and thousands of years. Especially right after breakup, we go out to our fish camp and when the first run of fish hits, we try and catch the first run of kings and chums, you know, when the weather is nice. Cause we never know from one day to the next day how the weather is going to change. And with this new regulations that came just this summer, regulation subsistence users to two 36-hour periods to fish for subsistence and if the fish return is really low they cut us down to 24 hours. And yesterday I was waiting for tonight to subsistence fish and I found out that Fish and Game had opened for subsistence from Thursday evening till yesterday evening. I, we had our radio on and there was no announcement. So that kind of got me feeling like going up and telling them 'hey, what's going on. You guys going to follow your regulation, you abide by what you brought out, you don't just make changes overnight.' You know because we only take, I'm always saying, 'we only take what we need'. We know how many fish to put away. We know, each family member, we put away 5 buckets, we know that's going to run us from now until May. I wish Fish and Game and Fish and Wildlife, know that, stocks are getting low, we know the conditions but one of the things that we have to have to have to live, we don't live on steaks and hamburgers because that's not our food. We have it now and then but we have to have our main dish like dried blackfish here, that's number one and you know, dried meat, that's good for the body. You know, that's good for us, you know, we, if we go to the store and buy hamburger, we're not used to it.

I really wish they would just at least, take the time to listen to our elders, instead of trying to set days, even preset days. If it's a rainy day on one preset time, they should close that and open it when it's good. We took a chance the last time and we ruined some. You know, we didn't try to. I've got my own time limit. I've got to go back to work, you know I've got my time limit and I tried but it's the weather. It's all the weather. Boy, we weren't happy with what happened and we

didn't try to, we tried to prevent it but... I was really glad when my neighbor told me, "her's too." I didn't feel so good but I still feel bad about some of that fish that had to go but. You can't try to regulate times, the weather is our boss when we're putting fish away. And I was telling him [indicating Charlie] earlier just go what they're going to do, they're bring me to jail if they're going to bring anybody to jail. They had to go and get out of my smokehouse.

I think a lot of these regulations that are you know, brought by the state and federal government are you know, they have big meetings in Anchorage, Fairbanks without the local input without local community up and down the Yukon. See what they think about it if we make these changes. Is that going to affect our way of subsistence fishing or what happens to the weather, weather factor? They start making these regulations and writing down on paper and then they say 'Here, here's what we proposed, here's what were going to do for the next five years.' And there's nothing we can do since its written on paper, hey we have to follow it. You know this summer I feel like breaking the rules because on a good day we are waiting, waiting for subsistence to open and when its subsistence time its way late in the evening. Who'd regulated to go out there and set net a certain time in the evening or night, you know. You wake up on a good day, well go up there and do it. We don't go by regulations. I don't believe in regulations. You know I think a lot of, especially fish and game, you know the last 20 years, and I've been attending meetings. Our people all say, 'listen to our elders, these elders been here for many, many years.' And Fish and Game, you guys are out here for 4 months and you think you know it all and you know you're the brains of all controlling fish. That's not my belief; my belief is always our elders because they're our guidance. They're the ones that tell us because its handed down to them from past generations and they know. And I believe that Fish and Game when they come out from Anchorage and go to Emmonak and set up camp, they are only there from May until maybe end of August and they know [?] and regulated, without even listening to our elders. Its just like, you don't tell me what to do and I'm managing the river. That's one thing that gets me mad. You know with our elders they have more knowledge than Fish and Game. Fish and Game, they're smart you know, they went to college and they work for their degree to get a job. I remember back in '65, I worked for fish and game. I was tagging fish down at Flat Island and we were tagging these kings. We tagged them out of a king net and we tagged them and we measured them and tell what sex they are, male or female and we take a scale sample out of their skin and we put it on a little tag and we let go. We throw that king over the river. Minute that king hit the water, some they take off and some just swim and other keel over. Because I remember I was part of that team when they did a study on, they wanted know how far the fish go from the mouth of the Yukon all the way up to Canada. There's no other Yukon River that can go once you tag fish, when they come up the Yukon, we know where they go. They go to their spawning areas. I've seen, three summers I worked for Fish and Game, they have new recruits; they call the students that come out to work. They don't know how some, they don't know how to set nets or start a motor. You have to tell them. Even my 4 year old can go out there and drift because he's seen it all. That's why our elders are teachers, we learn from them by watching. I'm not putting anybody down but that's what we go through, what we have to live. Especially when we are regulated by Alaska Department of Fish and Game and US Fish and Wildlife.

If I come to your home town in Illinois and I regulate, when to fish, when to hunt, I don't think, without me know what kind of conditions you live. You have to look at both sides, you have to feel, and you have to be on the border. Both Native and western culture, you don't take sides from one culture to another. [Yup'ikl] To be balanced.

If you want to learn more you have to come with open mind, you have to walk with an open mind. Fish and Game can learn the scales and stuff like that. It would be a big plus if they can go to our elders and learn the seasonal thing. It would really help instead of half assuming this is what they do just from looking at the outside or the top part.

Its not that I hate fish and game or fish and wildlife, it's the way they regulate our subsistence way of life. I think our elders come first when there needs to be any decision making. You know they should cooperate with our elders because we are here year round and these two young people here live here year round. I've known them since they were yea high and look at them now, they are into high school, out of high school and one of them is maybe going to college. So they know they live it, they see it. You know when summer's over they don't go outside and live where its warm. We're here year round. I think its one of the changes, I've seen a lot of, another thing is there's lots of boats out there now motors going up and down the Yukon. Sometimes you see the motor pass and it just smokes you know. I know that causes the fish to get sick.

You know the other sad thing that I see, even with my own kids, how many of them want to live like this. They don't, they come and they go back. My own kids. They help, they cut fish, and they help get wood and stuff. But to see them smoke, I don't know if they'll do it. Its so easy for them to run down and get Billy and some days they want, 'Mum you got dry fish, Mum is there dried fish?' You know they start getting hungry for main food, our main food.

I thought they were superstitious, they're not, I don't know where that word, and superstitious came from. Its not how it work, it not for real.

When you start smoking fish, you know its lot of smoke, you can smell that, you know you go in and out, you can smell that but you know today instead of going up town to take shower, you know, we have steam house and you get all that smell out and you are ready for the next day and you go back and forth.

You get all that smell out for the night and you start up next day. And how many of them really want to live that? It's different. It's going to be different. But you know when you get hungry; they're going to have to do it.

Our girls help us cut fish and you know that's a big plus to my wife Maggie and our boys come down and help too. Our biggest helper is my youngest one, Darryl. He's 12. He's down here most of the time and he loves to go out there and fish and we don't stop him from doing his drifting. You know once he catches one fish you know he tries maybe to catch more so. And that helps, you know this summer he caught a lot of whitefish and my wife cut them up to dry and when its dry, you know where they go [pats his stomach]. He's got more maybe all together, this summer on chums, jacks, maybe a bucket. Enough for a bucket. He's been a good fisherman since he was 7, 8 years old.

But that's what they have to know, you know we try to tell them. Whether they want to hear that or not, they have to because its getting scary. I always tell them, we're not going to be priority when food is getting low too on the other side. We're not going to be priority, they're not going to be stocking up the stores for you guys all the time. Its all over. It's not just us. It's a national issue

when you really look at the bottom line of everything. It's how we take care of our lives and ourselves. That happens even our land animals, some are starting to decline.

Did you catch what you needed this year, so far?

So far yeah, with the change of their new schedule this year for subsistence, subsistence fishing. I noticed that they changed our fishing schedule. At beginning of June we had 2 -36 hour periods. And that's regulated by state, State Board of Fish. And if fish decline, they cut it down to 24 hours. And if there's not too many fish then they regulate their own time. So this summer was pretty hectic for us to go out there and wait, you know, because even if we want to go by our time, we know one thing is weather factor. If they tell us to fish Sunday at 8pm and its rainy Sunday and Monday, so what's the use going out there and fish because we know that we are not going to cut fish on a rainy day because we know that they're going to spoil. So with the regulations they have, I feel like you know, we don't catch all the fish that come up the Yukon. We are not here to, because there are people from the mouth all the way up to Canada that subsistence fish. We only take what we can. In a 36-hour period, we're not going to get 300 chums one shot cut them all up. We go with the like here we have 3 families that are cutting fish together, which make it a lot easier and a lot faster to cut fish. And Emily here her husband passed away, how many years back and you know we get her every summer to help us cut fish so she can have fish for the winter.

Comments on Farmed fish

So I guess part of that too is the farmed fish that they release out in the ocean. You know farmed fish and wild stock are fighting over what they eat out there. So you never know where, I'm not here to blame. That's not for me to blame anybody. All these game, land and water are given to us by our creator, we're here to take what we can. I've never tasted farmed fish but I'd rather live on wild fish.

Comments on changes in land mammals

Even the game, wild game, they're coming down. Beavers this time, he had to go way up river to go beaver hunting. You see them all over now. Otters, mink. We see them were they weren't before. You know the people down river talk about moose. Its scary. It's a sign, the sign was predicted. And we're going to lose them. You know its instinct. We can't.

Beavers, they live on food. In one area, as long as they have food close by, they'll be in that one beaver house for years and years. When they have no food they have to move away where they can get more food. They are coming further down, even across the Yukon. All those creeks, right now they are plugged with beaver houses, every bend you go you see beaver houses. I call them little hotels. They do a lot work and a lot of damage, even black fish, black fish. That's one of our main foods. Following wintertime are blackfish, when they have no place to go, they stop, maybe they die off because they have no more food. They've been blocked by beaver dam.

Beavers are good in a way but right now they're getting too many of them all over. Even out to the coast they're saying beavers are ruining their creeks. They were well managed when I was growing up. Only allowed 10 beaver. That's before snowmachines came around and people were using dog team wintertime as far as you know from down the mouth. They'd travel up the Andreafsky River to hunt beaver, just to get 10 beaver. And you know sometimes the snow is so deep, they'd only go a mile, 2 miles and they'd camp. Today, you've got snow machines; you can be there in a few minutes, where we only go. Right now there's beaver all over state of Alaska. You can get any

limit you want. That was state law. They tell you how many animals you can get. Beaver, you were allowed 10 beaver. Now up the river its 20 beaver and south side of Yukon you can hunt beaver until maybe June.

I know it's a lot of hard work, putting fish away, but you're happy when everything is done and fish are put away in the bucket. And that way you know you'll have something for the winter. And this is just the start. The next thing we'll do is put up camp and next thing we do is wait for the bear to come around. If there's berries, we'll pick berries.



YUKON RIVER DRAINAGE FISHERIES ASSOCIATION

Traditional Ecological Knowledge of Salmon on the Yukon River

A project funded by the Federal Office of Subsistence Management

Interview Summary

Saint Mary's - 4

St. Mary's, Alaska

July 7, 2001

Question #1) Where do you fish for salmon and how long have you fished there?

I fish at the area around my fish camp, right in front of my camp. It is about a mile or a mile and a half southwest of Pitkas point. I have been at this spot since 1961. I went to the service and stopped coming to this spot for a few years but came back in 1968. In 1961 [a friend?] invited me to be his partner and we fished here together. There were no structures here then. It was not a historically good fishing spot but there is an airport road coming down, which is useful because you can get here by car if it is too rough on the water. That makes for a good opportunity to come back and forth by car or boat. The Boreal fishery is right next to us and has been there since 1974, buying fish commercially. I am a commercial and subsistence fisherman.

One of the reasons I've been here is I know where the fish will be. If I move to another spot, I'd have to reorient myself to that environment and find out where the fish are coming to and where they are heading. Here we know, we can just about tell where they will be. We know where the shallows are and where the channels are. In the wintertime, and come break up, when the water is very, very shallow you can tell where the channels are. If the river changes, the fish change. It's good to know the river and the area.

Question #2) What kind of fishing gear do you used for salmon?

I use a chum net, which are 5 ¾ inches and another chum net, which is 6 inches. And king nets which average 8 ¼ to 8 ½ inches. It depends on the size of the fish that are swimming. We use the same gear every year. We just mend them and make sure that they are usable for next season before we break our camp. They're expensive, its hard to buy new nets every year so we salvage them, mend them and hang them ourselves to save money to make ends meet. A new net can be anywhere from \$800, which is not hung to a pre-hung which is \$1800 to \$2000, depends on the size and the depth of the net.

I've had this boat since 1984 and I love it. It's just right, when its windy it doesn't blow hard. Before that in 1968 to 1984 I had plywood boats, before aluminum boats came out.

Question #3) When do the kings usually arrive in your area?

The kings arrive either second or third week of June. This year was very slow. They arrived very late here. When we hear that fish are arriving at the mouth, then we get ready for them. It takes 3-4 days before the first fish is caught. And then we fish subsistence until we catch our winter supply.

The fish swim an average of 30 miles a day travel time. When there are more fish in a school the fish swim slower.

Question #4) What kinds of things affect arrive time?

In the past we always heard [about the arrival of the fish] from word passed from village to village from Nunam Iqua or south mouth. Usually that's an indicator that they will be here in three or four days. We always aware and listening to other villages in the lower part of the Yukon River. It's always been like that.

It depends on break-up. The legends say they tend to swim in conjunction with the geese. When the geese come early, we know the fish will arrive early. When the geese come late, we know the fish will arrive late. They work in conjunction with the birds. When there are more birds then there will be more fish. That's the way it's always been. Our ancestors have always told us, my father and my grandfather, "you watch in the springtime when the birds come. If the birds come early, the fish will come early." I have experienced this as true.

Question #5) Can you remember any years that they arrived especially late or especially early?

About ten or twelve years ago they came in the first week of June, that's when they started hitting. We got our subsistence winter supply over night.

Question #6) Can you remember any years when the king run was especially strong or weak?

In the past there were so many fish we fished seven days a week.

Another indicator of predicting when the fish or how they will run is in the fall time when the eels run in the last part of October. If the eels are running heavy that means that the fish will run heavy. If the eels are slack that means there are not going to be much fish swimming up the river. We use those as indicators of how the fish will be coming up.

And then when there's northwest wind during the winter we know the fish are going to be coming in through the south mouth heavy. Like this year they are exceptionally heavy, very heavy. There's no doubt about the fish being heavy but Fish and Game says there's no fish. The elders and the native people have always observed, both the men and women would say, "Well, its going to be a good run of fish this spring when the come in." They are always watching how the fish will be. They are always observing the moon, where the wind is coming from. When the new moon is curved up like a bowl it means more fish. When it is curved down it means less fish. Those are the indicators of how the fish will be. These things have always been told. Hurts a guy when they doubt him and what he has been told for generations.

Question #7) Where do the kings position themselves in the river?

Sometimes when water is low, they channel and they swim up the channel. People say there are no fish but there's fish in the channel. You've got to catch them where they go over the shallow to go into the other the channel. If you know where to go and then keep watching then you are able to catch them. When they channel like that they are very hard to catch. You have to find a good spot. On high water like this, this is exceptional; in fact I used my fishing pole racks as tie down all summer. This is the first time in all these years that we've fished here that we've done that. With high water like this they tend to swim on the sand bar because they like to swim on different routes. They go on the sand bar and its very easy to catch them when its high water. They like where it's shallow because the current is not that strong there. Less burden, it's easier.

Whether they swim on each bank depends on the wind. They swim on the slack side. If it's real choppy here, they tend to move to the other side.

Question #8) Are there different kinds or stocks of king in this area?

Usually they run about the same time [each year]. This first kings are the ones that go under the ice. The second bunch is the ones when all the ice is gone. The third run is the white nose, the real big kings. You need to switch to larger gear during this run, 8 ½ to 8 ¾ to catch them. The last run is the one we call little feisty kings, real lively, full of fight when you get them. These ones are 4, 5, and 6 year olds. Right now in July, since the fish are running late, there's the last bunch coming in. Four runs. It's the same sequence every year.

Question #9) Can you remember seeing kings in the past that were not healthy?

The fish were always health in my young days. But this is the first year since 10 years that the fish are just superb. Perfect. They are in perfect condition. I hadn't got [unhealthy] fish, after drifting or catching, bringing the fish in, I've yet this year to see guts stuck on the side of the belly. Sometimes you see pus on the side of a fish, not this year. This year (2001) we have healthy fish. I don't know why sometimes they are not healthy. In 2002 they are 95% good fish.

Question #10) Do you think the kings are the same size now as they were in the past?

We are still seeing big fish. They are still the same size, no drastic changes. I caught a 4-foot female in 2002.

Question #11) Do you have any information about where the king salmon spawn?

Usually they go to the same spawning areas, wherever they spawn. King salmon in Andreafsky, when we get them red here we know that they are going up the Andreafsky River. When we catch them red here, they're the ones that are going up the Andreafsky. The ones that are still silvery, they are the ones going further up the Yukon River. They make the long trip to Canada. They come at different times in the season. About the first part of July or the middle of July, that's when the red ones going into the Andreafsky arrive. There's a lot of those caught at the mouth of the Yukon. If there's commercial season at that time we tend to go to the south side of the Yukon because the kings there are silvery and they are going way up the river. The ones on the north side are the ones that are going into the Andreafsky. If we are selling them commercially [and they are] the red ones, the price is down. And the south side, silvery ones, the price is up.

In the Andreafsky we have king salmon that spawn, chum salmon that spawn, cohos that spawn and in different rivers as they go up they know which rivers to go in to spawn. And history shows that every year, wherever they spawn is where they go, they go back to the same river.

In the first part of July the fish that are going to the Andreafsky, Anvik, Koyukuk swim on the north side of the river. The silvery ones going up the Yukon to Canada are here at the same time. My parents knew this as well.



YUKON RIVER DRAINAGE FISHERIES ASSOCIATION

Traditional Ecological Knowledge of Salmon on the Yukon River

A project funded by the Federal Office of Subsistence Management

Interview Summary

Saint Mary's - 5

St. Mary's, Alaska
July 8, 2001

Question #1) Where do you fish for salmon and how long have you fished there?

My fish camp is on my father's land. After he died it was transferred to our oldest brother, and he's gone and then the second one and they're gone. With second brother, oldest brother's permission, I'm here. For three years, I come down and cut fish here. Its better for me, its not like St. Mary's, climb up on a hill, because it's flat. It's good for my legs. For three years now, I forgot how many years now we've been here.

This got to be named Old Andreafsky when I was growing up. I don't know who gave it the name. When I was a young girl three white men came and they were starting to mark this place. First they used logs, they make it square and write and put it on the ground. They said this is old Russian or something used to be here. When I was a little girl, I used to see Russian crosses over there. All of them are down now and the trees growing. That graveyard over there are our relatives.

Question #2) What kind of fishing gear do you use for salmon?

My son fishes for me. One of my sons fishes for us. And everybody, my daughters, my grandchildren come down and help. They fish right out there, Old Andreafsky.

Question #3) When do the Kings usually arrive in your area?

Seems like fish, the first run comes in June.

Question #4) What kinds of things affect arrival time?

The ice floes [affect arrival time]. Seems like we had late spring, I'm not too sure about that. Maybe when we have late spring, maybe they don't come when there's ice. Maybe they don't swim under the ice.

People know when the fish come in. It would be windy maybe from west. That's the time. Heavy ones run and because of these orders we can't set net.

Long ago, a guy, some big guy, maybe he's a fortune teller Eskimo, he used to tell his people when he was sitting in the kassiq, you know the steam house, men's steam house, when they're sitting in there, he would tell a story, telling them about the future. About these things, they were happening. I was never born yet but... His stories were about the young generations, about the time before they had canned food, no stores. He used to say that guy would say, someday the young generation, he mean trash, those young generation trash would be shiny. We didn't know he meant cans from the store. We never used to have one place to put trash. When I lived here, when I was a little girl we had a big house, right there, log house, two tents. We used to dump our slop bucket right in front and we never used to get too many cans from the stores. We used to put them in one. I think he mean those, generation's trash will be shiny. And the air will be noisy, like planes and boats and loud snowmachines. He said all those things and other things too. And then this one thing, seems like its getting close to happening. He would say, when he would tell stories he would measure himself, they would say he was tall guy.

Question #5) Can you remember any year that they arrived especially late or especially early?

Seems like fish, the first run comes in June. Before when they used to have commercial fishing, when commercial fishing starts, we still fish for subsistence. They fish as much as they want. When they hit, the fish heavy. After that, when they started the commercial fish, even we know they're running we can't [fish for subsistence].

Question #6) Can you remember any years when the king run was especially weak or especially strong?

When I hear about people saying that Fish and Game watch and count the fish I don't believe that they count all of them. Maybe they miss some. Even they say, they're getting too few for commercial but I'm glad we can get subsistence. Us older people don't believe that there could be no more fish. I don't think so, I don't know.

Question #7) How do the kings position themselves in the river?

I've been hearing, we've been complaining about Fish and Game, what they watching the fish, even down river. I don't think they set their net in the right place and they say there's not much fish even though there are lots of fish swimming, because they didn't set their fish in the right place.

Question #8) Are there different kinds or stocks of kings in this area?

I never really see something different that they are different from the other salmon. They are all the same to me.

Question #9) Can you remember seeing kings in the past that were not healthy?

Some yes. When we cut fish I notice that some have spots on their meat inside the skin. When they're like that, when they look not normal I cut them for the dogs. I mark them so we don't eat them. Some we just throw it. You know it looks like pus, but its white and kind of milky. Sometime they'll be hard, kind of hard, really almost yellowish, greenish white, something really. We have seen these for a few years. Even once in a while, long ago. Even in the wintertime, what they catch by net, they don't look too good. We have to be careful, might be something harmful. We have to cook the eggs really good. We have to watch. The fish would look so nice, like whitefish in the wintertime. And then something inside, the liver is stuck to the inside of the fish. That's not normal. Even I like to eat that fish, I don't cook. I don't know why it looks like that. Often I think about this sewer when I'm thinking about all the villages. Everybody's sewer I think is going to the Yukon River. They are supposed to think it. The lagoon in St. Mary's goes out to the Andreafsky and the Andreafsky comes out here.

Question #10) Do you think the kings are the same size as they were in the past?

Seems like they are smaller. I think they are changing size. They are not so many that big.

Question #11) Do you have any information about where the king salmon spawn?

Why do you think that there are less fish now?

We are not the only ones from Yukon fishing. There are lots of people fishing on the Yukon. That's why those other people fishing catch too many. That's why they are getting less around here. I hear that when they go up river, past this area, way up river. I hear that they take eggs that are supposed to becoming fish. Some people sell them.

Sometimes people, they take too much and they don't take care of it. That's how come we throw away. Its better to take care of everything. Most of the time, until I'm getting old, when we have too many, sometimes we can't take care of the head. And we are so tired so we just throw them away. Seems like not too much respect. I only remember that. Sometimes people don't take good card of everything. Taking good care means using everything, even the bones. We hang the bones. We saw the heads, king salmon heads or cut them and dry them. Even the tails. Some people make Eskimo cheese out of the king salmon eggs. I never learned that yet.

When it rains, the fish don't dry right. The bugs come in. We can't fish them. The subsistence closures can mess up the timing of fishing and drying.



YUKON RIVER DRAINAGE FISHERIES ASSOCIATION

Traditional Ecological Knowledge of Salmon on the Yukon River

A project funded by the Federal Office of Subsistence Management

Interview Summary

Saint Mary's - 6

St. Mary's, Alaska

July 8, 2001

Question #1) Where do you fish for salmon and how long have you fished there?

Mainly down around old Andreafsky. We catch the fish there and dry them here [at the house]. We've been fishing there forever, a long time. That's the only place we go fishing, down there.

Question #2) What kind of fishing gear do you use for salmon?

We use king gear for kings and chum gear for chum salmon. 5 ½ to 9 inch.

Question #3) When do the kings usually arrive in your area?

Spring. There have been several times when we've caught all the kings we need before the end of May. Usually first week in June, early part of June.

Question #4) What kinds of things affect arrival time?

Weather, mainly the weather. The run sometimes doesn't coincide with the opening. Certain winds will direct the fish to a certain mouth. When it's windy, it's too hard to fish.

Question #5) Can you remember any years that they arrived especially late or especially early?

There have been several times when we've caught all the kings we need before the end of May.

Question #6) Can you remember any years when the king run was especially strong or weak?

No I can't. There was a lot more king run than last year. Our elders tell us that they come in abundance before they disappear. The knowledge learned from my father is that when animals or fish are too highly talked about or limited by man, they are lost to humans.

Question #7) How do the kings position themselves in the river?

The ones that swim on the north side versus the south side, you can see the different color of the fish. Some are turning red. Their position is related to the water level and the sand bars. They come out of deep water and take a shortcut through the sand bars and channels.

Question #8) Are there different kinds or stocks of kings in this area?

Several years they are large. White noses are a kind of king. There are three runs of kings, the black nose, the white nose and the regular kings. The black nose come before the white nose.

Question #9) Can you remember seeing kings that were not healthy?

Sometimes when we cut fish, some have really soft flesh and some have firm flesh. Some have pus pockets and some have whale bites. We saw about six or seven this year (2001). We have seen

these in the past too. We noticed two or three of them that had blood near the backbone. I've never seen that before, right between the layers of meat. The fish were healthy before the hatcheries formed.

Question #10) Do you think the kings are the same size now as they were in the past?

When there are north winds there are mostly smaller fish. It depends which of the three mouths they come in but I don't know which one. When there are certain winds all winter long then the fish are small.

I've seen a king that was 110 lbs. That was in the 1970s. That was the biggest one I've seen. They come in different sizes.

They are average about the same size.

Question #11) Do you have any information about where the king salmon spawn?

I know they go up the Andreafsky River and the Anvik River. There's a place on the south side too.

Other comments:

We don't take more than we can handle especially if it's raining. I don't like the subsistence openings. People just catch what they need for the winter.



YUKON RIVER DRAINAGE FISHERIES ASSOCIATION

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Interview Summary

Holy Cross - 1

Holy Cross, Alaska

July 12, 2001

Question #1) Where do you fish for salmon and how long have you fished there?

We fish out of here [Holy Cross]. We have a smoke house right near the house. We started in 1995 I think, over here anyway. I fished with my dad across the slough 1985 to 1989.

I fished with my parents 4 miles up in Victors growing up until 1968. Right across Victors. We had a camp there and stayed there all summer long. A half mile up from Walker's slough. Victors is named after a guy.

Now we fish straight out. I drift. There are set net places but there are so many logs. I just fish for subsistence

Question #2) What kind of fishing gear do you use for salmon?

I use 7 ½ size net for king. I don't fish for chum unless they are silver and really good looking. Just used basic nylon nets.

With my parents we also used fish wheels. We had a fish wheel and different kinds of nets for the different fish, chum and salmon. But they outlawed the fish wheels in the 1970s. My dad used to make nets all winter long. Then they're ready by springtime. He made them out of twine. That was his hobby in the evenings. I watched him make them while I did girls stuff.

Question #3) When do the Kings usually arrive in your area?

June. It varies different years. The 20th maybe, the 23rd. Later this year, so much high water. Maybe the 3rd week in June.

Question #4) What kinds of things affect arrival time?

The water. It's whenever you go out to catch, if they're there, they're there, if they're not, they're not. Because a long time ago, we used to move to camp in May and then start catching in June. And now it seems like its later in June. Dad's camp was really near so we'd just go. Sometimes we'd catch shee[fish] or whitefish, and of course mom would hang and cut those too. Then pretty soon the big hit would hit and then they'd start fishing. I don't think they waited for any thing. Just listen to what's happening down river. And then they'd say, well they're catching down there so another week or so we'll be getting fish.

ADF&G schedule leads to different fishing patterns. Sporadic fishing because of the schedule which makes you catch fish at the end of the run. We have to dry the fish in different stages.

When long skinny green bugs come before the rain then silvers come.

Question #5) Can you remember any years that they arrived especially late or especially early?

Seemed like they were late this year (2001) compared to last year. It took longer for them to get here than last year. Or maybe we had to wait for a certain time, our opening to go out. They could have been here earlier but we had to wait. The main part of the run may be passing in the second or third week in June.

Question #6) Can you remember any years when the king run was especially strong or weak?

Last year (2000) the run was not as strong.

Only thing that affects fishing is the commercial people. And how much they get down below us. Because this year they didn't have it and we got a lot of big fish. All these years they've been commercializing, we've been getting little fish and not very many. And all of a sudden there was none and then everybody was getting a bunch of fish. First time they didn't have commercial anywhere so you know that's a factor. We had some really nice looking big fish. Haven't seen those in years.

When I was growing up they didn't have commercial. Long time ago there was always an abundance of fish. We'd get our quota and quit. Nobody had to tell us when to quit or how much to get. Each family knew how much fish they needed to get for the winter. And when they got that they quit. They didn't keep fishing and fishing because they were greedy. They always left some. And then the commercial started and now we have to wait for them to get their money because they eat money.

There's always been salmon, from our elders on back. Never been a time of shortage. Just since the 1990s there's been shortage.

In 2002, we missed the blue backs due to the ADF&G management schedule. The runs were weak in the 1990s and since ADF&G took over and pollution.

Question #7) How do the kings position themselves in the river?

They swim in the shallow part. But it seemed like they were all over this year. But the water was so high. In hot weather we notice they go further out, away from the bank, fishermen say this. In rough weather they come up to the top of the water, maybe because it's murky. They go to the eddy or current, the cut bank. Channel changes and snags make people fish in different places.

Question #8) Are there different kinds or stocks of kings in this area?

Seems like the last run is the white nose, their meat looks different. The middle is blue backs or last run [didn't seem sure about this]. We probably miss the first one, might even go under the ice - I was told this but I don't know for sure. The blue backs are big ones, pretty looking, solid, firm nice big fish.

Question #9) Can you remember seeing kings in the past that were not healthy?

The 80's they were pretty good. Last year (2000) a lot of them were wormy and had big sores on them. Really pale meat, looked like hatchery fish. They just look different than Yukon fish and take longer to dry. Dry looking and pale. That was last year. There was only a couple like that this year. It's been more and more in the last 10 years. In the past we sometimes got fish that were bit by seals but nothing like this.

Their parents only saw seal and whale damage to the fish.

Question #10) Do you think the kings are the same size now as they were in the past?

They are bigger than last year, and then years before we had bigger ones. Seems like they've been getting smaller and smaller. This year they were better. The commercial gets them before us. This year we got some good size fish. I don't know if it's the commercial or the river. [We got] 4 or 5 year olds this year.

The fish in 2001 were bigger than in 2000. The fish in 1999 and before were bigger than 2001. It seems like the fish in the past were bigger but we should consider the smaller net mesh size we used. The elders say when the mosquitoes are small then the fish are small. When I was smaller the fish looked bigger.

Question #11) Do you have any information about where king salmon spawn?

I notice some are real torpedo shapes and some are real round. The torpedo ones must be going to Anvik River. They look different than some of these other ones. I [Alden] worked at the ADF&G sonar.

The white noses must be heading somewhere else. Some go up Shageluk River.

Some go up the Innoko. After Anvik, I don't know. Toward the end of the run there are some really red ones.

Comments about schedule:

We got our fish but it took time. Took longer. These openings are crazy, once a week, twice a week and then you have to wait. It's really hard on the smoke house and the wood because you are drying fish for days and days. And then the next opening you put more fresh fish in there and then you are using up your smoke and then waiting for the next opening. I've got about four different batches of fish in different drying levels in there. Where as before you put it on in there and close it up and you're done. My fish don't look that good this year. It's just too much different, harder drying them too. You want to fill up your smoke house and be done with it.



YUKON RIVER DRAINAGE FISHERIES ASSOCIATION

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Interview Summary

Holy Cross - 2

Holy Cross, Alaska

July 12, 2001

Question #1) Where do you fish for salmon and how long have you fished there?

Right out here in the Yukon River, we start above the Innoko River and go down river. Before we used to up by Victors, but it's really snaggy up there. Down here it's a lot better. We've been there since 1980, cutting fish up there. Before that I used to help my grandparents up in Ghost Creek but I was just fooling around, I wasn't involved in the fish only the dog salmon, not the kings. I started in 1979 actually cutting silvers, so I'll know how to cut kings in '80. I practice on silvers. That's the year we got 300 silvers, 1979. We were about the only people getting silvers. We lived up in camp. Now we go up there cut fish and come home. We don't stay up there. It's too buggy. My camp is right across.

We go for only kings. We don't go near the shore or we would get dogs. We catch some dogs but those we cut and hang for eating fish because we don't have dogs to feed. During silvers [in the fall] we go out and get silvers if my husband is not working. What we call silvers are what others call fall chum.

Question #2) What kind of fishing gear do you use for salmon?

We use drift net maybe 100 or 150 feet. It's 35 mesh, and 7 $\frac{3}{4}$. That's what came [when we ordered]. Before we had a bigger net but it got ruined.

Question 3) When do the Kings usually arrive in your area?

They've come as early as the 10th of June and as late as the 15th, 16th or 17th. One time it was the 20th of June before we caught a fish. The sheefish come and then the salmon come.

Question #4) What kinds of things affect arrival time?

Depends on when they come into the mouth. If it's too frozen they can't come in. But then Nick says the king salmon come under the ice. I don't know because you can't go out there when there's ice. I kind of believe it because way up river they are cutting fish at the same time as us. According to Fish and Game they swim 36 miles or 26 miles a day and they get way up there in that short of time. They're getting the fish that belong to them.

There are certain birds that come, the fish birds they are little birds, when we see those kinds of birds, then we know the fish are here. They are little dark birds. Not swallows. And the other way is by the blue bells, when we see the blue bells we know the king salmon are here. The blue bells are flowers, when you start seeing the blue bells then you know the king salmon are here. You just walk around and see the flowers. When we go for silvers, there are little bugs on the water. That means the silvers are here.

Question #5) Can you remember any years that they arrived especially late or especially early?

They've come as early as the 10th of June and as late as the 15th, 16th or 17th. One time it was the 20th of June before we caught a fish. The sheefish come and then the salmon come.

Question #6) Can you remember any years when the king run was especially strong or weak?

There was no time in the past that we did not get fish. We've always gotten what we wanted so I can't say the runs were strong or weak. 1997 was a disaster year but we targeted 200 and we got 200. 1999 was a good year. 2000 was a weak year. 2001 was better and 2002 was even better. We get what we need.

Question #7) How do the kings position themselves in the river?

I think they come up, they go underneath in deep water, they stayed under we don't see them, and when they get up that way it gets a little more shallow. And they come up and they get them. There are really deep channels. Some fish go way down deep and then when they get to where they are supposed to be going they come up. At Victors there are 120 feet of water. I think some fish go way underneath and they are going where they have to go and we only get the ones that we are supposed to get. They like the cold water.

They like to swim the current. You look at the water and you see where all those little swirls are, and it's in a line. If you go off of it to far you get dog. They swim there because it's easier for them. Like eddies, they swim around and rest in there and then they keep going. There's lots of eddies, so they can take a break. In the main eddy, you'll see kings, you'll see dogs, and you'll see silvers. But you can't get them, they are right there in the eddy. You can't fish in there because it is heavy current. You'd have to have two boats and you'd have to really watch each other because if one gets out of line, it's whole net will go that way.

We go for only kings. We don't go near the shore or we would get dogs.

Question #8) Are there different kinds or stocks of kings in this area?

The run is part over when we've already caught the big fish by July 12th. When you get the white nose then you know it's over. Those white nose don't run very long, two or three days and then they are gone. That's the end of the run, the white nose. But on the teleconference they said there's still more coming in at the mouth so I'm hoping there's more.

Blue backs, we just had some last week [1st week of July]. Blue backs are dark blue kings and they are big and they are wide, wide stomach. They are the best, they have lots of meat on them. I've never seen any of them spoil. Like with little spots, I've never seen any like that. I've seen regular kings with those little spots but never blue backs. Blue backs come right before the white noses.

You get king salmon and those run for a while, and then you get blue backs and after blue backs you get white noses. There are four different kings. There's the king salmon, then there's the blue backs, then there's the white nose and then there's the white meat one. That's not even ours, it belongs on the coast. We never used to get those, things are changing. I think they are coming inland. They belong to the coast people. Just in the last 3 years I started noticing them. Their meat is white. When you cut them they are real light color and they are hard to cut. Their meat is more compact than the reds. When you hang them they turn red. It could be the smoke.

Question #9) Can you remember seeing kings in the past that were not healthy?

I haven't caught any with disease this year. Not yet. Last year we had a few but not this year. I haven't seen one this year [with disease.] We've seen some with war scars, they've been chewed up somewhere. In the past we never saw those spots. Year before last [1999] we started seeing them with disease.

Question #10) Do you think the kings are the same size now as they were in the past?

They used to be big. I have pictures of them. Take two hands to pull it out, instead of using one hand to grab the tail. These were big fish. This year we caught 3 big ones. First time, last year they were all very short. This year only we've had bigger fish, all the salmon we've had were small fish [before]. Probably because they were caught in the ocean before they got here or they just never returned.

Question #11) Do you have any information about where king salmon spawn?

All four kinds know where they are going and are headed to different places. I don't know where except Anvik above us, and Grayling. Then above Grayling there are king salmon that go on this one side, I don't remember, some go there and some go way up. You look at the eggs, if the eggs are a little bit small then they are going a long ways. They are going someplace but not around here. They follow each other.

Anvik River fish have bigger eggs, huge big bunches. We saw these more in the past, big eggs. We don't see as many of these, the egg fishers. The egg fish are always last.

Over in Albert's and the Innoko. Albert's is a big lake out, 18 miles out, get off the slough and get into the lake. You can see king salmon up in there. It's on corporation land.



YUKON RIVER DRAINAGE FISHERIES ASSOCIATION

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Interview Summary

Holy Cross - 3

Holy Cross, Alaska

July 12, 2001

Question #1) Where do you fish for salmon and how long have you fished there?

We fished at Paimut, 30 miles down river from here, since 1971. But last four years we fished here [at Holy Cross]. We started fishing when commercial first opened around 1960. I had a fish camp 12 miles below but lost it and then moved to Paimut. I fishing in 2001 but not in 2002.

Question #2) What kind of fishing gear do you use for salmon?

I used set net for king. We catch enough chum in king nets for eating use. The net is 8-½ and 8-¼ mesh. I used different gear for commercial time. I used 8 ½ and 9 for commercial. That's all I used since 1960.

Question 3) When do the Kings usually arrive in your area?

It depends on break-up. Most of the time they arrive the first week in June. This year (2001) they are late. I think they came June 14th. We used to catch them June 15th before.

Question #4) What kinds of things affect arrival time?

Break-up. When the ice goes out, the fish come in. I don't think the weather has anything to do with it unless the wind keeps the ice at the mouth and keeps the fish out till the ice goes out. Sometimes you get a winter and there's all the ice there and the fish just stays out there until the ice goes out. We figure one year when we got fish on May 26 that they came in under the ice. One year we caught 17 fish a day here before they'd even caught any at the mouth.

Water level has a lot to do with fishing. High water is good for set net, low water is good for drifting.

Question #5) Can you remember any years that they arrived especially late or especially early?

Sometimes we get them May 26, that's really early. That has happened 3 times in May but I can't remember what year.

Question #6) Can you remember any years when the king run was especially strong or weak?

They've been strong for a long time, just the last few years they've been weak. At one time, I can't remember what year, commercial opened up and the buyer came by at 8 o'clock that night. We'd just got through with setting nets. There were a lot of us fishing in one spot down there. I told the boys, might as well go out and see if there is any fish, two hours after we set the net, we got a hundred kings on it. That was late, July, when the commercial opened up. They were thick. That must have been in the early 1990s.

I've never heard of salmon shortage in my life except the last few years. We always got enough, 3 or 4,000 pounds and we quit. The only reason I can think of for the recent shortage is high seas and False Pass catching all the fish.

Question #7) How do the kings position themselves in the river?

Sometimes they are in deep water and sometimes they are in shallow water. Depends on the water and current. When the current is stronger they like the shallow because they can go faster. They go 30 miles a day. They mostly swim on the north side, I don't know why. When the water is low they go in the deep water.

The test fishery at Emmonak doesn't catch the fish because they set their net on top of a sand bar. Other people fish right next to them and catch fish because the fish stay in the channel.

Question #8) Are there different kinds or stocks of kings in this area?

We have the blue backs, they are bigger salmon and we don't get them sometimes until the first week in August or last week in July. We get them very seldom because we don't fish that long. They come later in the season. We caught some blue backs in 2002.

Hook nose salmon come once in a great while before the white noses.

White nose are here now (July 12), they come before the blue backs. We didn't fish that period. That's all we get here.

Question #9) Can you remember seeing kings in the past that were not healthy?

No, all these years every once in a while you see worms in the meat but we don't think anything about it. Last year (2000) we had a few with the spots but not this year.

Question #10) Do you think the kings are the same size now as they were in the past?

They are better fish this year (2001) than last year, nice and silvery. Last year we got all little ones. Last year they were so small. We got 249 salmon last year and this year we got 215 and we quit.

This year they are a lot bigger size than last year. We used to catch 60-pounders when we were commercial fishing down there. They are not around today anymore. I don't know why unless they are catching them out in the high seas. Our fish usually average about 26 pounds, average weight. They were smaller in 2002. We don't see the big ones anymore.

"People get what they want, then they quit. That's why we have so much."

Question #11) Do you have any information about where king salmon spawn?

I don't know if the different kinds are going to different places. They go way up the Yukon River somewhere. I don't know where. They probably go in different rivers. Maybe some go in the Anvik but I've never heard of any. A few might go up the Innoko River but very few though.

They go up the Atchuelinguk River and the Andreafsky River. I know this because when a big run is coming, they don't arrive. They go up the lower tributaries.



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Interview Summary

Holy Cross - 4

Holy Cross, Alaska

July 12, 2001

Question #1) Where do you fish for salmon and how long have you fished there?

I was born in Holy Cross and come down and fish every summer, commercial and subsistence. My fish camp is 20 miles below Holy Cross. I have fished here since I was a kid, my mother used to fish here and my dad. I came down every summer. I'm going to be 72 [years old]. That means I've been fishing with them for 72 years at this location. They were not the first ones to fish at this spot. There were other Demientieffs here too. My grandpa, before my dad came here too. They had these fish camps as far as everybody can remember. When my mom was young, she was born in 1895; they had them all along the Yukon. They use to fish and make their own nets. As far as everybody can remember, they've been fishing here. This spot was chosen depending on the eddies. They used to depend on the eddies a lot more than we do now. They didn't used to fish like we do, drifting. They would find an eddy and grab it. Subsistence you could do both but commercial you had to do one or the other. I am a commercial permit holder. I fished for silvers, chums and kings.

Question #2) What kind of fishing gear do you use for salmon?

I use 8-inch mesh for kings. 50 fathom. And 45 mesh deep now. Set nets, we use a shorter one, about 20 fathom. We used to make all our nets. My mother used to help make them because we couldn't afford to buy anything. Then we had fish wheels. Before snow machines, we had dog teams. I remember getting 20,000 dogfish. I remember we had about 15 dogs so we'd keep 10,000 dog [salmon] and then the other 10,000 we'd trade for groceries and everything we'd need. Boats come down and they had everything in them and we'd trade with them. Flour, sugar, whatever we needed.

The fish wheels are still legal, you can use them for subsistence.

Question 3) When do the Kings usually arrive in your area?

They arrive anytime after about the 5th [of June], sometimes later, like this year it was late.

Question #4) What kinds of things affect arrival time?

Some years they are late. I guess they go by the temperature of the water. We were watching the ice break up this year and there was still ice down in the lower Yukon so we knew they were going to be late because the fish don't come up when the water's cold. They don't come in. They mill around out in the Bering Sea and wait, the so-called donut hole. That's where they were catching them because they are just milling around and they are easy prey.

This El Nino has a lot to do with this lack of fish, that's part of the problem. Four years ago, we went to visit our friend in Fairbanks, some people came down from Point Barrow, visiting there. They said this is the first time in memory that there were 1,000's of fish in Point Barrow. It was clear water and they could see them swimming all over. They said never came up there before. El Nino has something to do with that. That's why it's so crazy now. And that's part of the problem, of course there's others.

The second biggest problem is California, Oregon and Washington State. And now they are coming from the East Coast with their factory ships and some of them are 400 to 500 feet long. They stay right out here in the Bering Sea, and they got the little boats fishing and they process them right there and then they've got barges that can haul 400,000 pounds. And they are going back and forth steady to Washington, Oregon and California. And now they are going to the East coast because they are closing the fishing over there because they fished it out. So that's the next big problem.

I think part of the chums was the eggs that they were selling. They didn't manage it right. They were going up Anvik River and that's where they are spawning. Then they say it's the Yukon fishermen, but the fish we catch on this river is just a drop in the bucket compared to what the factory ships are getting out there. My nephew was out there and he said as far as you could see with binoculars, it looked like a big city out there. Out here in the Bering Sea, and they are fishing, bottom fish and everything else. They are not regulated, 200 mile limit, the state has control. The state they are not going to stop them. Big bucks and they are big companies. Lot of politics out there. Now number 1 problem is those big factory ships out there. They are the guys they have to regulate. Like in False Pass, intercepting all the kings. They stopped that. El Nino and then the factory ships. Some of them are 500 feet long. They are catching every kind of fish you can imagine and what they don't want they throw back in the ocean dead. 3 big problems. And better management, don't go up the spawning areas to get eggs.

There were never any times in the distant past that the salmon crashed or didn't come back.

Question #5) Can you remember any years that they arrived especially late or especially early?

Question #6) Can you remember any years when the king run was especially strong or weak?

Why are there less fish now?

Far as I could remember, there were a lot of fish. We could see them, we used to row to Holy cross, It would take us about 18 hours. The fish were all over the place jumping. I think there were more fish back in the 1940s. But now the whole world knows about it now so naturally there will be less. That's why they need a good management.

Question #7) How do the kings position themselves in the river?

The first run goes right up the main channel. Then when the water is high, you can set your nets on top of sandbars and catch fish. They don't follow the channel when its high water, they are confused so you can catch them anywhere. This river has been here for millions of years, the fish have had training for a long time, they know where the previous fish went so they go the same side.

Question #8) Are there different kinds or stocks of kings in this area?

The first run is the super fish. It goes up under the ice, it follows the channel that's why nobody could catch them. They go up into Canada. The Athabaskans and SE Indians catch them up there. In that big lake, 50 miles long.

Blue back is about ready to come now. We got the white nose around the 1st of July. They come in before the Blue backs. I might be confused. My mother was living down here in 1990 and she went by nature, certain birds. We'd tell her there are no more fish and she'd say no there's another one coming. The old people knew things by the grass, by gnats. So I think there's another blue backs coming.

Maybe 5 or 6 runs, according to this old timer from Norway. His dad was raised here. They were good fishermen and they study. He was president of a fishing association in Anchorage.

Question #9) Can you remember seeing kings in the past that were not healthy?

We got some of those fish 2 years ago with the pus. They were good this year. If we open them up, if they have pus, we just dump them.something about herring and bait.

Question #10) Do you think the kings are the same size now as they were in the past?

Sometimes we get small ones. I think El Nino has something to do with that.

Question #11) Do you have any information about where king salmon spawn?

The first run goes to Canada. Kings are hard to figure out because one year they went up to Pt Barrow. Certain years they just go where ever they please. Most rivers they do go up. The go up Koyukuk. They go up Anvik. Innoco, Adidrad.



Traditional Ecological Knowledge of Salmon on the Yukon River

A project funded by the Federal Office of Subsistence Management

Interview Summary

Holy Cross - 5

Holy Cross, Alaska

July 13, 2001

Question #1) Where do you fish for salmon and how long have you fished there?

Above Walker slough on the Yukon. Patsy Island, 20 miles below Mountain Village. More fish down there and more buyers down there.

Question #2) What kind of fishing gear do you use for salmon?

I was a commercial fisherman in district Y-2. Fishing below Marshall. I drifted for commercial and used a fish wheel for subsistence years ago. We did use a net for king salmon for ourselves, set net. 25 mesh deep net, we sink them right to the bottom. The size is 8 or 8 ½ [inches].

Question #3) When do the Kings usually arrive in your area?

The first run of kings comes up not too long after breakup. Used to be second run of kings followed by the third run of kings. And the first run of chums comes up at the same time as the first run of kings. The second run of chums comes up when the second run of kings comes up. Used to be a lot of fish. We used to cut fish for our dogs and for ourselves. 14,000 sometimes. We had 22 dogs, working dogs, for trapping and hauling kings.

First kings arrived in first few weeks of June.

Question #4) What kinds of things affect arrival time?

I don't know really. We wait for them after the ice goes out. Fish and Game says the temperature of the water but I don't know much about that. We know its time to fish because we see the jumpers. Then we would pull out the fish wheel.

They say they came under the ice but I've never seen that, that was just a story I guess. I don't know for sure. Some years its all different. It's all different every year. It all depends on when the ice clears out. It usually takes a couple of weeks.

Question #5) Can you remember any years that they arrived especially late or especially early?

Sometimes they come at the end of May, the call them the ice king salmon. Used to be a run right after break up but I never seen that.

Question #6) Can you remember any years when the king run was especially strong or weak? Why are there less fish now?

In the later 30s and upper 40s there were a lot kings out there. But after they started fishing in the high seas they dropped down to not too many. They were always good. The first part of the 1950s was still good. Even in the 80s they were still getting them pretty good down below. But up here

there were not buyers. But for subsistence you could always get what you need. I think they started to decline the 1950s with the fishermen in the high seas.

The trawlers throw the fish they can't sell overboard. What they can sell they keep. No one wants to speak up because they might be lost overboard.

Question #7) How do the kings position themselves in the river?

The run goes along the cut bank, along the edge of the river. They don't swim over the sand bar. They like the eddies. You have to find their trail by moving your net back and forth when you are drifting. The eddies make it easier when they swim. They just like the good eddies.

Question #8) Are there different kinds or stocks of kings in this area?

The first run was pretty good size. Came right after breakup. The second run was smaller ones and they ran closer to the beach. Third run came in July. They weren't broken up like they are now. Blue back or white nose are the last ones, comes later in July. I don't know the difference between them.

Question #9) Can you remember seeing kings in the past that were not healthy?

I never noticed any disease on them. Except they had big scars on them, I guess the seals are after them too. Chum salmon used to have tapeworms or parasites. We didn't use them. They've always had that

Question #10) Do you think the kings are the same size now as they were in the past?

Way back in the 1930s and 1940s they were good-sized kings. They look like they got smaller to me. Now this year they say they have good size again. I suppose it has to do with what they have to eat out in the ocean.

Question #11) Do you have any information about where king salmon spawn?

No, not really. I know they go up the Innoko River because some of my friends have a camp up there. They probably went up Anvik River and some other places.



YUKON RIVER DRAINAGE FISHERIES ASSOCIATION

Traditional Ecological Knowledge of Salmon on the Yukon River

A project funded by the Federal Office of Subsistence Management

Interview Summary

Nulato - 1

Nulato, Alaska

July 24, 2001

Question #1) Where do you fish for salmon and how long have you fished there?

We fish at Ninemile camp and the islands nearby. I used to fish with my mom and dad until I was old enough to work at the canneries. We also fish in the Yukon and inside the slough. We get all our kings right there. We have a smoke house here in the village. We just go down in the morning and the evening and check the nets at about 7am and 9pm. You can't leave the king salmon in the net too long, they cook fast in the water and they get soft. You have to get them out quick. Once they get caught in the net they don't last very long. They die right away. We just look at the net and leave it for the whole day. They are too rich and they don't last very long. You can leave them in the net for a couple hours after you catch them. But any longer is not good.

Mickey- Uncle Chrispin sometimes set nets too. It depends on who he fishes with.

I fished in this spot for 5 years. I fished all over in the past. When we drift we do it up here. On Nulato side of Ninemile Island in the main river. A long time ago, my mom and dad fished there in 1948 at Ninemile. We had a camp right there. We used to paddle across. They set net. I used to but then I had to go out for a job. I also worked in the canneries in the summer. Then I fished for chums after the king salmon.

Question #2) What kind of fishing gear do you use for salmon?

We just set net. Some guys drift with longer nets. The set nets we use are 100 feet and 5-½ mesh. They are not too good when they are bigger. If they are bigger than 6 inches the fish go right through the net. Sometimes we catch chums, if they don't go through the net, if they don't get caught by their teeth.

We also use fish wheels. They used to make them bigger for the king salmon, so they can go in the deeper water. It's a lot of work though. You need a lot of fish cutters. Sometimes when the salmon run over night it fills up. That's a lot of salmon.

Question #3) When do the Kings usually arrive in your area?

The king salmon run was early [this year?]. After the 15th of June the king salmon start showing up. [This year] there wasn't too much king salmon then. Then the chums start showing up the last week of June. King salmon quit around the 1st or 2nd of July.

Question #4) What kinds of things affect arrival time?

This year was a late break up. That's why the salmon were late. And it was a cold spring. The salmon didn't get up here right away. The salmon don't swim under the ice that I know of. White fish and sheefish do swim under the ice.

Question #5) Can you remember any years that they arrived especially late or especially early?

The 15th of June is very early for them to be here. This year they arrived around June 20th. That's about the latest that salmon arrive. They start showing up little by little. Sometimes it takes a week or so.

Question #6) Can you remember any years when the king run was especially strong or weak? Why are there less fish now?

There were less king salmon in the past than there are today. There were so many king salmon this year (2001) because they closed down that fishery at False Pass and they all came through. There were not very many king salmon in the past. Sometimes people just barely got enough for their use. Every year the king salmon are getting more and more, a little bit more every year.

Long time ago there used to be a lot of chums. Fish wheels boxes used to overflow with 500 or 600 fish. Nowadays the people don't really go after that many fish anymore. They mostly go after silver. Chums were for dog food and nobody has dogs anymore.

This year is the biggest run of king salmon that I have ever seen and the longest run. It's almost 3 weeks long. This is due to the shut down of False Pass. There was never a shortage of fish before commercial fishing started. People could get enough fish for all their dogs for the winter. Once commercial started, the fish started going down slowly. Commercial fishing takes the eggs. They let the males go, they throw them back in and they keep the females. They take their eggs and throw the salmon away. There's no young fish. The roe fishery closed 4 years ago.

This river is not big enough for commercial fishing. Most of the people that live on this river fish subsistence. We're about to run out of salmon up here. Commercial fishing is killing all our fish in a short time.

I used to fish with my mom and dad until I was old enough to work at the canneries. There was so much fish it'd keep us busy night and day. Some summers, every 3 or 4 years, the salmon would be kind of low. I heard that every 4 years it's supposed to be low and then it comes back up.

Question #7) How do the kings position themselves in the river?

Most of them stay out in the deeper water. Where it's deeper, it's slacker too. They like the slack water. They go where there's slack water. A lot of fish will go by here. They swim on either bank, it doesn't matter, and they just follow the deep water.

The chums like to swim in the shallow water especially along the bar. The king salmon stay out in the deep water.

Sometimes they catch king salmon in Ruby or Galena before we catch them here. Because they stay out in the middle and we can't get them.

Question #8) Are there different kinds or stocks of kings in this area?

The first run is kind of dark, really dark. Some of them are big. The second run is all grey, light grey. These are the white noses. They are not too big but they are really good salmon. There is not a third run.

Everybody used to fish chums. There was no fall chums. Then in August, people would stay at their camps waiting for the silvers. They came for just a little while and not too much. They were eating fish. They put away enough and moved back into the village. After this silver salmon then the Chinooks came in the fall. Nobody fished them.

Question #9) Can you remember seeing kings in the past that were not healthy?

No, I saw sores but not on the flesh. I never saw disease. This year's kings are good. I saw the ones with sores on them before but not this year. The ones with the sores were a couple years ago but not when I was a kid.

Question #10) Do you think the kings are the same size now as they were in the past?

No, I don't know any difference in the sizes. They are about the same. King salmon are all different sizes. But chum salmon are the same except the males and the females are different. Long time ago there used to be silver. I don't see silver runs like that anymore. Right now what they call silver are not really silvers, they are part chums. They are mixed. In the past they used to be more silver. I used to see that, up here on Bishop Mountain. He fished for silvers in August. He had a lot of guys cutting for him. That was quite a while ago, maybe 60 years ago. The fish here are little tiny fish.

Question #11) Do you have any information about where king salmon spawn?

All the salmon don't come up this river. There are too many side creeks where the salmon turn off. Even king salmon go up the Nulato River. We know the fish go up there because we hunt black bears up there. We paddled four days way up there, almost behind Kaltag. We go as far as we can go with summer water. When we turned around there were still chums and king salmon going up river. A lot of salmon go up that river.

They also go up south fork of Nulato River, right fork. It took us four days traveling. We just wanted to see how far the salmon go. That was in August.

The two runs just follow the same route. I think the salmon know where they are going and they branch off accordingly, like the Koyukuk River. Each run doesn't necessarily go to a specific location.

2002 – the salmon were good this year.



YUKON RIVER DRAINAGE FISHERIES ASSOCIATION

Traditional Ecological Knowledge of Salmon on the Yukon River

A project funded by the Federal Office of Subsistence Management

Interview Summary

Nulato - 2

Nulato, Alaska

July 24, 2001

Question #1) Where do you fish for salmon and how long have you fished there?

When I was a little kid, 5 years old, I used to live over here. I was down at Holy Cross here. When I came back [to Nulato] we used to fish over here. Right before you get to Four-mile Island, at Nulato River, and at Two-mile Island. [We also fished] on the other side of Ninemile slough, at the bluff, and at the creek. Six places. Here's where I grew up. The Patsy's live there. There are good shallows here and the king salmon come through here.

We just fish from town now. Families fish together, three whole families fished with us. The first people to get fish share it with everyone. That's our tradition. We share with the elders first.

Question #2) What kind of fishing gear do you use for salmon?

My parents used a fish wheel. A lot of bars and channels started changing. The fish didn't go through there any more. We caught king salmon in the fish wheel. They only run for two weeks. They set the fish wheel in the channel. They started stopping it at nighttime so the fish are fresh.

After king salmon they switch to dog salmon fish wheel. After the wheels, we seine. Now they use seining net.

Question #3) When do the Kings usually arrive in your area?

The king salmon run for only 2 weeks. Before the dog salmon started running. It was just my dad, mom and my brother. The fish wheel used to go around the clock for 2 weeks.

The fish usually arrive around June 25. That's when we move to camp.

Question #4) What kinds of things affect arrival time?

Commercial fishing changed things. Everything changed when commercial started. Last year they caught most of the take. This year the real kings came in from the sea not from the hatchery. They are richer this year.

Temperature could affect things or a cold winter.

Question #5) Can you remember any years that they arrived especially late or especially early?

Its always around the 25th of June for King salmon.

Question #6) Can you remember any years when the king run was especially strong or weak? Why are there less fish now?

Couple of times that I know, pretty far back there were no fish. People had to get rid of their dogs. They take so much. This was in the 1940s. Some people went up to the Koyukuk River to get fish. Then they go back [home].

The old people never explained why the fish never come. (Maybe when the fishnets were across the whole mouth- Mickey) We had a lot of fish all the time until commercial started.

Marianne- This year was really good because of the closure of the commercial fishery.

Question #7) How do the kings position themselves in the river?

King salmon, the first run in June, go all the way in the middle [of the river]. They avoid the ice. They don't go into eddies, they stay in the current. They go all the way to Rampart. By that time we start catching fish here. Our run goes in the eddies and rests.

The kings stay on the south side of the bank. They hardly come on this side, too many rocks and stuff. The other side is thicker.

Question #8) Are there different kinds or stocks of kings in this area?

The first [of kings] run is grey, the ones that past by. The second run is all mixed looking. Some are pretty, some are black, and some are really red. Some have different kind of noses.

Two runs of dog salmon. [The come in] July, one week apart, the 4th of July and the 8th of July they hit again. They quit around the 10th of July for dog salmon.

Then the silvers come in August. They used to come in September a long time ago. Now they come earlier.

Question #9) Can you remember seeing kings in the past that were not healthy?

I've never heard of that [disease]. I've never heard anything about it.

Marianne- I think we got one with white spots on the flesh this summer.

Mickey- before we used to get more that one. Last year we got quite a bit. That's one of the biggest differences between this year and last year. The run last year had a lot of affected fish. They get sores all over from rocks and then they go up the Yukon. They call it 'worn out fish.'

Question #10) Do you think the kings are the same size now as they were in the past?

We got lots of little king salmon. [May be Jacks]

Question #11) Do you have any information about where king salmon spawn?

They go up Koyukuk River and lots of other rivers that go off the Yukon.



YUKON RIVER DRAINAGE FISHERIES ASSOCIATION

Traditional Ecological Knowledge of Salmon on the Yukon River

A project funded by the Federal Office of Subsistence Management

Interview Summary

Nulato - 3

Nulato, Alaska

July 24, 2001

Question #1) Where do you fish for salmon and how long have you fished there?

We used to fish at Nine Mile bluff, down river from Nulato, by the point. Right there on the map, where it says Nine Mile Camp, on the other side. We also used to fish halfway down Halfway Island. Now we go up and across on the other side, Patsy slough, right on the other side, on the mainland and one right on the point. We don't always fish on both sides but sometimes we do use both sides.

When you have a good fishing spot people will take it from you. We lost ours at Nine Mile Island. We lost it because we don't want to argue and fight over it. We never say anything, we just feel ugly inside. But we can always find another spot.

Then we fished at another spot that Fred fished at when he was a little boy. That's how we found that spot. After we lost our fishing spot we started looking around for another place. We tried this place and we had 10 kings the next morning. We felt really good about finding a place so we've been hanging on to it for a while now. More than 3 years. It's much better and cheaper because we don't have to run all the way down to Nine Mile Island.

We use a fish wheel right up in the slough up at Three Mile, inside Patsy slough. Jack Patsy had one there too. We used to fish with Jack Patsy. My dad did. People don't use fish wheels anymore. My brother was the last one who used to have one at Halfway Island.

Question #2) What kind of fishing gear do you use for salmon?

We use or used set net, fish wheels and seining. Currently, we catch fish at the entrance to Patsy slough with seining and nets. The kings salmon nets, we order from Donaldson. We used to commercial fish when that was happening in Nulato, for roe. The whole family worked including our grandkids.

We also used to use fish wheels in the slough up at Three Mile, inside Patsy slough. They used to get 300 or 400 kings a day. People don't use fish wheels anymore. People stopped using them because there aren't any more [fish] sales, only up around Ruby. It's so deep and cut in so much, erosion changed and made the river deeper so fish wheels weren't so good anymore.

Question #3) When do the Kings usually arrive in your area?

They got here on June 20th this year. That's about normal.

Question #4) What kinds of things affect arrival time?

I heard they were under the ice at the mouth. They come into the mouth when the ice is still there. I think when you have an early breakup they come early. When you have a late breakup they come late.

Question #5) Can you remember any years that they arrived especially late or especially early?

I remember there was one year there was no fish, we had to kill our dogs. 1960 or 69(?). On the 23rd of July Anthony was born and we were done with our king salmon fishing. (What yrs were these?)

Question #6) Can you remember any years when the king run was especially strong or weak? Why are there less fish now?

I remember there was one year there was no fish, we had to kill our dogs. 1960 or 69(?). On the 23rd of July Anthony was born and we were done with our king salmon fishing. (What yrs were these?)

The heaviest run is right before the 4th of July. This year was a big run and it lasted a long time. I can't say we didn't ever have enough fish. We have enough every year. We stop fishing when we have enough. It always seems like its right for us because we are always satisfied with what we get.

Question #7) How do the kings position themselves in the river?

Kings swim on the other side, opposite the Nulato side, where there's no current. They stay down on the bottom where there's no current.

Chums / silvers also run on the other side. The good fish swim over there. The fish that swim on this side are dogs or weak fish. It's swifter.

Question #8) Are there different kinds or stocks of kings in this area?

The heaviest run is right before the 4th of July. The males came in first this year. Then the females come in a few days later.

The first run is the better fish, as they are not all scarred. The first ones are shinier, like the ones out in the ocean. They are headed to Canada. They are solid when you cut them. The best ones are solid. The meat is harder, like a tighter muscle.

The red ones spawn on the Alaska side. They are the ones that are going up river now (July 24, 2001). They go to places like the Nulato River. When they start turning color they are the ones that are soft, the meat.

We call the first run of salmon king salmon. Chinook that come in the fall are not king salmon. King salmon have spots and these Chinook don't have spots. A few reds are Chinook but they are not king salmon. They have funny taste, like iodine. Some people like them. We don't call king salmon, Chinook. After all the fish go by, there's another run that we call Chinook. They have a shape like humpy's. People don't even cut them like we cut eating fish. They cut it in a different way. They only get a few, like 10 and they are satisfied. There is a misunderstanding about silvers

too. Coho is silver. Four species of salmon run up here: King, dog, Coho or silver and then Chinook. Sheefish come before the kings, right after breakup.

Question #9) Can you remember seeing kings in the past that were not healthy?

This year there was a couple unhealthy fish with white milky stuff in the meat. There was also a couple that had the gel, a clear jelly in the middle or patches of jelly. In the past, we always come across a few every year. We just throw them away. It doesn't scare us because we always see it. We just throw it away or give it to the dogs.

This year the fish looked good. They dried really well. When we put them away they looked dandy. We did our jarring and we jarred some strips. We did a little bit of everything.

Question #10) Do you think the kings are the same size now as they were in the past?

The kings are bigger this year than they were 4 years ago. Everybody says it's the hatchery fish.

They follow cycles, they get bigger and smaller over time. The old timers say if the small ones come first that means you will have a good long run. They come all the same size in a bunch.

Question #11) Do you have any information about where king salmon spawn?

They spawn in the old Koyukuk River. There used to be no fish going up the Koyukuk River but now there's a lot. People from there used to come out to fish and now they fish up there. They used to come out to the Yukon River to fish and then go back with all their good eating fish.

The salmon look for clear water in side creeks.

Comments about new fishing rules:

We just had one opening for our silvers last year and we had to work until we dropped. It was very hard work. Abuse. Sometimes we have to cross the river when it is very rough, with white caps to take the net out because the rules say its time to take the nets out. Used to be we would just wait until the river calms down. We are older people, aged 76 and 68 and we have to risk drowning to follow the rules or go to jail. The rules also say your name has to be on the post, on the floater. It's hard to think of doing these things after all these years of fishing.



YUKON RIVER DRAINAGE FISHERIES ASSOCIATION

Traditional Ecological Knowledge of Salmon on the Yukon River

A project funded by the Federal Office of Subsistence Management

Interview Summary

Nulato - 4

Nulato, Alaska

July 25, 2001

Question #1) Where do you fish for salmon and how long have you fished there?

I fished with my mom and dad at Patsy Slough. We used a fish wheel site for kings there. There's a good eddy in Patsy Slough. We also fished on the east side of Nulato Island. We had a camp at Ninemile Camp. We got most of our kings on the south bank around Ninemile Camp. The only place to get kings on the north bank is across from Ninemile Camp.

The first time we caught kings, it was with my mother and father while my husband was at the cannery. We put a small net out near the Bluff, just downstream from Ninemile Island. We caught a big king salmon. It was so big it would have knocked them in the water if it were moving.

Question #2) What kind of fishing gear do you use for salmon?

We use fish wheels, seining, and set nets. Currently (2002) we set nets.

Question #3) When do the Kings usually arrive in your area?

2002- First king was June 9th, that was sort of early. The 16th of June is normal or the usual time that I catch fish. I'm done drying fish by August 3rd.

Question #4) What kinds of things affect arrival time?

2002 – don't really know.

Question #5) Can you remember any years that they arrived especially late or especially early?

2002 – Four years ago it was the 5th of June. In 2002 everything was early- spring, fish, fall.

Question #6) Can you remember any years when the king run was especially strong or weak? Why are there less fish now?

The time I got 75 kings, I think it was 1993 or 1994. That was the best year. You could see the fish out there. I caught over 100 fish in a day. It was really thick with fish that year. It didn't really ever slow down. In 1993, 1994 you just put in your fish net and there's already king salmon in it. Those were good runs those days.

Nowadays the king salmon are not that thick. The most we caught was 62 in a day [this year]. Used to be the most we caught in a day was 200.

The old people used to say; when the sky is red at night it means that there will be lots of fish running. The fish arrive the next day heavy.

Fish bird, turns toward the water and sings then the fish come the next day. It's a little grey bird, similar in size to robins. Its also called Fish Mother.

Question #7) How do the kings position themselves in the river?

Chums swim on the Nulato side and kings swim on other side. But sometimes they are mixed and you can catch kings on the Nulato side especially at the Bluff (across from Ninemile camp). There are very few places for set net and very few places for seining. That's just the way they run. They stay on the side opposite Nulato because it's deeper over there.

At nighttime they come toward the beach (Nulato side) and during the day they travel. They might be resting in an eddy. Behind Ninemile Island, there is dead water. They rest there. When there are choppy waves, they go to the beach. Usually they follow the channel.

Question #8) Are there different kinds or stocks of kings in this area?

There are the blue fish, the Canadian blues. These are the second run. They are light blue or a little dark blue. They are good fish, red meat like kings. They are Canadian fish. They are all mixed in the same area where we fish. The blue fish come last. I've only noticed these for last 5 years.

The other fish are silver or red. This is the first run, the real ones. They are mixed silver or darker. You can't tell the two runs apart.

Then the white noses. We only got them in 2002. They are too rich. They are too rich for dried fish. Better half dried .

Question #9) Can you remember seeing kings in the past that were not healthy?

Some fish are nice fish but full of white spots inside. We cook them for the dogs. In 2002 we caught one like this.

Question #10) Do you think the kings are the same size now as they were in the past?

Now there are big ones and small ones. They are about the same size as when I was a kid. Seldom you get a bunch of big ones. Good luck when you get a small one, like I'.

Question #11) Do you have any information about where king salmon spawn?

Kings spawn in the creeks. I haven't seen them go up there but I know they count them in the Nulato River. They also go up Ninemile River. They don't just spawn in the Nulato river, they spawn all over. Some spawn right behind our camp.



YUKON RIVER DRAINAGE FISHERIES ASSOCIATION

Traditional Ecological Knowledge of Salmon on the Yukon River

A project funded by the Federal Office of Subsistence Management

Interview Summary

Nulato - 5

Nulato, Alaska

July 25, 2001

Question #1) Where do you fish for salmon and how long have you fished there?

We didn't stay at fish camp this year. We just stayed in town and fished. The fishing schedule makes it hard to stay at camp because it's a long way to go. Our fish camp is 18 miles down, halfway between here and Kaltag. We just call it Halfway. It is a family camp that's been in our family for generations. That's where I fish. I was born there too in 1939. That was my parent's fish camp too. Its good fishing when the fish are running. I normally go fishing for kings and chum, whitefish and sheefish and Chinooks. Anything that's edible I dry and put away. We only sun dry chums.

This year we fish right from here (Nulato). There are good places to seine right from here. Everyone uses the same spots at different times. There are spots across Sixmile, behind Ninemile Island and across Koyukuk; those are the places that everyone goes seining for kings.

We used to put a net in behind Halfway Island across from our camp a long time ago but now it's no good for that. The channel changed. They used to put king salmon nets in Koyukuk slew. On this side of the island we caught more dog salmon.

Question #2) What kind of fishing gear do you use for salmon?

My daughter and her husband went seining with regular king salmon net and they use kicker boats with a 50 horsepower Honda. My daughter and her husband just started that 3 or 4 years ago.

We used to put a fish wheel in on this side of the island for dog salmon, but we didn't catch much. We caught all kinds of salmon in the wheel. They don't allow us to use it anymore because they want the fish to go up river. The last time we used a fish wheel was 1999. We started seining because we don't get the king salmon at the fish camp. From here they go out seining to good places close by to here.

Question 3) When do the Kings usually arrive in your area?

Usually the kings run early. But this year they didn't start running early. If they start running early, then we quit before the end of June. That way we move to fish camp, around June 21. The fish usually start running around the 9th or the 10th of June. This year it started later than that. I don't remember what day. It was a good run though.

Question #4) What kinds of things affect arrival time?

You can tell the fish are coming in because somebody will have a fish net down at the point. They start catching dog salmon. Pretty soon they catch the little kings. Then we wait for word from down river. We hear they are in Holy Cross. Then people start getting ready. When they get to Grayling then we know its time to get ready.

Question #5) Can you remember any years that they arrived especially late or especially early?

All I can remember is they start to run around June 8, 9 or 10.

Question #6) Can you remember any years when the king run was especially strong or weak? Why are there less fish now?

This year is the most fish that we've caught. The amount of fish we catch is based on being in the right spot at the right time.

Some years were poor years and some years were good years. Long time ago they used to commercial fish down by the mouth. I don't ever remember hearing about the fish not showing up. Sometimes they are not as thick as other years. This year they were good. Last year they were good but not really that good. Seems like every other year is good. If we didn't have a good year, they say we will have a good year in 3 or 4 years, especially if they don't open that fishing down at the mouth.

Question #7) How do the kings position themselves in the river?

In the summertime, it's always best to seine at night. It's too hot during the day. They stay out from the bank. Late afternoon is good. And when it rains its time to seine too, if you've got the right kind of gear. You have to stay dry.

The fish swim mostly on the cut bank side, the island side. The water is deeper there. That's why everyone goes fishing on the other side. Long time ago they used to fish on that cut bank side. I know my dad used to fish across the river. He would catch king salmon on the other side and dog salmon on this side.

The dog salmon stay on this side. I don't know why. But all the dog salmon, except a few, stay on this side.

Question #8) Are there different kinds or stocks of kings in this area?

The king come up first and then the dogs come up.

They say there are always two runs. The last run is not as good as the first one. It's also mostly females. The grey skin is better, that is usually the first run. The red ones are not as good. They are good fish too, some of them. But some of them are not, white meat. We make strips with them. We cut them for sun dried fish and then I smoke them because they are not rich. We didn't catch that much white ones. They make good strips because they are not rich. They dry hard. The ones with white meat are just older fish as they come up stream.

Question #9) Can you remember seeing kings in the past that were not healthy?

If we get sick fish with the white we throw them away. So far we only got two this year. Last year we got lots. We have to cut them open to find out if they are sick. They look beautiful from the outside. But inside they have white spots and the smell. They have a strange smell. I never heard about this before. It seems to be happening since 5 or 6 years ago. I've never seen the fungus in chums, just in kings.

Question #10) Do you think the kings are the same size now as they were in the past?

They are the same. But we got big ones this year, a lot bigger than we were catching last year. When I was smaller, every fish was big. They were extra big this year. That's because it was open way down that way. When they were commercial fishing they were catching all the big ones. The big ones came in earlier. Seems like we were catching them further out from the beach.

Question #11) Do you have any information about where king salmon spawn?

They spawn in all the side creeks. There are lots that go up Koyukuk River. There are no creeks around our camp where they spawn. But they go up in Nulato River and Ninemile Creek too. I think the first creek they run into, that's where they go spawning. They go back to where they were born.